



SUB-COMMITTEE ON  
RADIOCOMMUNICATIONS AND  
SEARCH AND RESCUE

5th session  
Agenda item 14

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## REPORT TO THE MARITIME SAFETY COMMITTEE

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## 1 GENERAL

1.1 The Sub-Committee on Radiocommunications and Search and Rescue held its fifth session from 11 to 15 December 2000 at the Headquarters of the Organization under the Chairmanship of Mr. V. Bogdanov (Russian Federation), the Vice-Chairman, Mr. U. Hallberg (Sweden) was also present.

1.2 The session was attended by delegations from the following Member Governments:

ALGERIA	LIBERIA
ANGOLA	LITHUANIA
ARGENTINA	MALAYSIA
AUSTRALIA	MALTA
BAHAMAS	MARSHALL ISLANDS
BAHRAIN	MEXICO
BANGLADESH	NETHERLANDS
BELGIUM	NORWAY
BRAZIL	PANAMA
CANADA	PERU
CHILE	PHILIPPINES
CHINA	POLAND
CROATIA	PORTUGAL
CYPRUS	REPUBLIC OF KOREA
DENMARK	ROMANIA
EGYPT	RUSSIAN FEDERATION
ESTONIA	SAUDI ARABIA
FINLAND	SINGAPORE
FRANCE	SPAIN
GERMANY	SWEDEN
GREECE	TURKEY
IRAN	UKRAINE
IRELAND	UNITED KINGDOM
ITALY	UNITED STATES
JAPAN	VENEZUELA

and the following Associate Member of IMO:

HONG KONG, CHINA

1.3 The following United Nations specialized agencies and intergovernmental and non-governmental organizations were also represented:

INTERNATIONAL TELECOMMUNICATION UNION (ITU)  
INTERNATIONAL CIVIL AVIATION ORGANIZATION (ICAO)  
WORLD METEOROLOGICAL ORGANIZATION (WMO)  
INTERNATIONAL HYDROGRAPHIC ORGANIZATION (IHO)  
LEAGUE OF ARAB STATES  
INTERNATIONAL MOBILE SATELLITE ORGANIZATION (IMSO)  
INTERNATIONAL COSPAS-SARSAT PROGRAMME AGREEMENT  
INTERNATIONAL CHAMBER OF SHIPPING (ICS)  
INTERNATIONAL ELECTROTECHNICAL COMMISSION (IEC)  
INTERNATIONAL CONFEDERATION OF FREE TRADE UNIONS (ICFTU)

INTERNATIONAL RADIO-MARITIME COMMITTEE (CIRM)  
THE BALTIC AND INTERNATIONAL MARITIME COUNCIL (BIMCO)  
INTERNATIONAL ASSOCIATION OF CLASSIFICATION SOCIETIES (IACS)  
OIL COMPANIES INTERNATIONAL MARINE FORUM (OCIMF)  
INTERNATIONAL FEDERATION OF SHIPMASTERS' ASSOCIATIONS (IFSMA)  
INTERNATIONAL LIFEBOAT FEDERATION (ILF)  
INTERNATIONAL COUNCIL OF CRUISE LINES (ICCL)  
INTERNATIONAL ASSOCIATION OF DRY CARGO SHIPOWNERS (INTERCARGO)  
WORLD NUCLEAR TRANSPORT INSTITUTE (WNTI)  
INTERNATIONAL SAILING FEDERATION (ISAF)

1.4 In welcoming the participants, the Secretary-General referred to important decisions taken by the Assembly at its twenty-first session and the Maritime Safety Committee at its seventy-second and seventy-third sessions pertinent to the Sub-Committee's work programme.

He mentioned, in particular, the MSC's instruction to the Sub-Committee to consider the outcome of the regional Conference on Maritime Search and Rescue and the GMDSS, held in Florence, Italy, in October 2000, as the Committee was keen to receive the Sub-Committee's advice on any action, it might deem appropriate, in connection with the proposal of the Conference calling for the establishment of five subregional rescue co-ordination centres to cover the African coastline from Morocco anti-clockwise to Somalia and also the establishment of an International SAR Fund.

The Secretary-General then turned to the Sub-Committee's important task of considering the outcome of the ITU World Radiocommunication Conference 2000 with particular regard to the revised Radio Regulations and the recommendations and resolutions adopted by that Conference concerning the maritime mobile services. He recalled that the 1997 ITU World Radiocommunication Conference had adopted the generic allocation, for the mobile-satellite service, of the frequency band which, until then, had been assigned exclusively for the maritime mobile-satellite service. As a consequence of that decision and following the privatization of Inmarsat, the twenty-first Assembly had adopted resolution A.888 on Criteria for the provision of mobile-satellite communication systems in the GMDSS. Since then, a number of new satellite communication systems had come into being or were being planned and they might utilize the former maritime band. However, the Organization had not yet been notified by the Governments concerned about these developments, for recognition and use of the new systems in the GMDSS and providing all types of communications: from distress alerts to private telephone calls. This could lead to the GMDSS losing access to the unique resources of the world-frequency bands, a development which the Sub-Committee should consider very seriously.

The Secretary-General stressed that there was a need for improvement in IMO's relationship with the International Telecommunication Union. As an example he mentioned that the Organization's position on maritime matters for discussion at the recent ITU Conference, which had been prepared by the Sub-Committee and approved by the MSC, had not been considered in detail by the Conference; instead, it had been received as a document providing information only without any perceived need for action on it. He therefore believed that, at ITU meetings, the status of the United Nations specialized agencies, dealing with safety-related matters and protection of human lives, such as ICAO, IMO and WMO, should be distinguished from the status of other international organizations and ITU sector Members, being private companies. This view had been shared by MSC 73, which had taken a number of actions of which the Sub-Committee would be informed under agenda item 5.

Turning to the problem of false distress alerts, which continued to cause concern, the Secretary-General recalled that the Sub-Committee had repeatedly considered this issue over the past years and guidance had been issued to Governments and the industry on how such false distress alerts should be avoided. At this session, it would again consider submissions addressing the problem and prepare more Guidelines for shore-based maintenance of satellite EPIRBs and ancillary devices and decide if further action needed to be taken by IMO.

Referring to search and rescue matters, he observed that the International Convention of Maritime Search and Rescue was dedicated to the rescue of people from the perils of the sea – a humanitarian duty, which should always be discharged promptly irrespective of any political or financial implications, the size and type of the ships involved or the sea area and the nationality of the persons in distress.

Returning to the Florence Conference on Maritime SAR and the GMDSS, the report of which, including its recommendations and resolutions, would be presented to the Sub-Committee for consideration, analysis and action, the Secretary-General recalled that, at COMSAR 4, when considering the report of the 1998 Fremantle Conference and, in particular, Resolution 5 on the establishment of an International SAR Fund, the Sub-Committee had agreed that the issue should be addressed on a five-step basis, an approach which had later been endorsed by the MSC, including the action it had already taken on the first two steps. In light of the outcome of the Florence Conference, it was expected that the Sub-Committee would consider the next steps in this process and make recommendations to MSC 74, in particular on the proposals calling for the establishment of the five subregional RCCs and the International SAR Fund he had mentioned before.

He then identified other important issues on the Sub-Committee's agenda such as the consideration of the report of the Joint ICAO/IMO Working Group on Harmonization of Aeronautical and Maritime SAR; the development of a practical system for the preparation of SAR co-ordination plans for passenger ships which pass through many SAR regions and the Sub-Committee's contribution to the "IMO Standard Marine Communication Phrases".

He concluded by referring to resolution A.900(21) (Objectives of the Organization in the 2000s), and, of all the subjects on which the Assembly had directed the Committees, under the co-ordination of the Council, to focus attention, he specifically mentioned:

- the shifting of emphasis on to people;
- the effective uniform implementation of IMO standards, in particular the revised STCW Convention and the ISM Code;
- the development of a safety culture and environmental conscience; and
- the strengthening of the Organization's technical co-operation programmes and delivery on a priority basis.

The Secretary-General expressed the hope that the Sub-Committee would respond positively to the requests of the Assembly and the Council and would contribute substantially to IMO's concerted efforts for enhanced safety and environmental protection.

1.5 The Chairman thanked the Secretary-General for his words of encouragement and stated that the Secretary-General's advice and requests would be given every consideration in the Sub-Committee's deliberations.

### **Adoption of the agenda**

1.6 The Sub-Committee adopted the agenda, as approved by MSC 72 and confirmed by MSC 73. The agenda of the session, including a list of documents submitted under each agenda item, is given in annex 1.

## **2 DECISIONS OF OTHER IMO BODIES**

2.1 The Sub-Committee noted, in general, decisions and comments (COMSAR 5/2, COMSAR 5/2/1 and COMSAR 5/2/2) pertaining to its work made by NAV 45, NAV 46, DE 43, STW 31, MSC 72, MSC 73 and A 21 and took these into account in its deliberations when dealing with relevant agenda items.

2.2 The Sub-Committee noted, in particular, the instruction by MSC 72 (MSC 72/23, paragraph 15.16) to all Sub-Committees to apply the Human Element Analysing Process (HEAP) given in MSC/Circ.878/MEPC/Circ.346 as a matter of priority in their work and the request to provide information on experience gained during application of that process with a view to further improvements, which the Committee would take into account in its work, as appropriate.

### **Measures aimed at eliminating substandard oil tankers: Provision of ports of refuge**

2.3 The Sub-Committee noted the outcome of MSC 73 (COMSAR 5/2/2, paragraph 5) on a set of measures aimed at eliminating substandard oil tankers, in pursuance of a request of MEPC 45. In order to positively respond to MEPC 45's request to consider establishing, an *ad hoc* working group to deal with these measures, MSC 73 had tasked such a group with the consideration of the matter.

MSC 73 had approved the report of the Working Group in general and decided that its report (MSC 73/WP.14), as amended, should be referred to the sub-committees and to MEPC 46, requesting them to consider it in general - i.e. not to embark on substantial debate – but to address the relevant proposals for their attention and then advise MSC 74 on the outcome of the consideration of their assigned issues and submit possible proposals for inclusion in their work programmes.

With regard to the Sub-Committee the MSC 73 Working Group had agreed with a proposal by the delegation of Greece to examine the need to establish principles for coastal states, acting either individually or on a regional basis, to review their contingency arrangements regarding the provision of ports of refuge, taking into consideration national sovereignty rights. The identified areas of refuge should have arrangements in place to allow ships in distress to take refuge. This selected new proposal was given in item 5 of the table set out in MSC 73/WP.14, annex 1.

2.4 Having considered the matter briefly, the Sub-Committee agreed to return to the matter under agenda item 11 (Work programme) and instructed the SAR Working Group to consider the issue as well and provide input on this issue (see paragraph 8.88).

### **3 GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS)**

#### **MATTERS RELATING TO THE GMDSS MASTER PLAN**

3.1 The Sub-Committee noted that, in accordance with its instructions and using information provided by Governments after February 1999, the Secretariat had issued Corr.1 and Corr.2 to amend GMDSS/Circ.8 (Master Plan) in September 1999 and June 2000, respectively.

3.2 The Secretariat informed the Sub-Committee that since issuing GMDSS/Circ.8/Corr.2, it had received the updated information from Brazil, Chile, Egypt, Italy, Lithuania, Malaysia, Peru, the Russian Federation, Trinidad and Tobago, the United Kingdom, Uruguay, Vietnam and Hong Kong, China mostly regarding installation of sea Area A1/A2 facilities and NAVTEX stations. The Secretariat planned to issue GMDSS/Circ.8/Corr.3 in February 2001.

3.3 The delegation of Greece expressed concern regarding the absence of MF DSC coverage in some areas of the Mediterranean Sea (see annex 3 to GMDSS Master Plan – GMDSS/Circ.8/Corr.2) and, therefore, suggested that ships sailing in those areas should be fitted with equipment for sea area A3.

3.4 Noting the above information, the Sub-Committee requested Member States to check their national data in GMDSS/Circ.8/Corr.2, for accuracy, and provide the Secretariat with any necessary amendments, as soon as possible, and to respond to MSC/Circ.684, if they have not already done it.

3.5 The Sub-Committee also noted with interest the presentation made by the Secretariat on the IMO electronic chart office information system – OCEAN VIEW which is still under development and is expected to be used for creating databases related to the GMDSS Master Plan, a global SAR plan, piracy and casualty statistics and other information containing geographical co-ordinates. A possible allocation of such databases on the IMO Web site is under consideration.

#### **Outcome of the twenty-first session of the Assembly**

3.6 The Sub-Committee noted that the Assembly, at its twenty-first session, had adopted resolution A.887(21) – Establishment, updating and retrieval of the information contained in the registration databases for the GMDSS, developed by COMSAR 3 and approved by MSC 70.

3.7 It was recalled that resolution A.887(21) had been developed with a view to assist Member Governments in implementing provisions of the new SOLAS regulation IV/5-1 on the Global Maritime Distress and Safety System identities entering into force from 1 July 2002.

#### **Reports of the 10<sup>th</sup> and 11<sup>th</sup> Baltic/Barents Sea Regional Co-operation Meetings on the GMDSS**

3.8 The Sub-Committee noted information by Norway (COMSAR 5/INF.5) and Denmark (COMSAR 5/INF.6) on the outcome of the Tenth and Eleventh Baltic/Barents Sea Regional Co-operation meetings on the GMDSS held in Bergen, Norway, from 31 August to 2 September 1999 and in Copenhagen, Denmark, from 5 to 7 September 2000, respectively.

## **Report of the 10<sup>th</sup> North Sea Regional Co-ordination Conference under the GMDSS**

3.9 The Sub-Committee also noted information by Iceland (COMSAR 5/INF.8) on the outcome of the Tenth North Sea Regional Conference under the GMDSS held in Reykjavik, Iceland, from 27 to 29 September 2000.

It was decided to change the name of the North Sea Regional Co-ordination GMDSS Conference. Therefore future meetings will be organized under the name "North Sea and North Atlantic Co-ordinating Conference on Maritime Radiocommunications" (NSNA-CCMR).

### **VHF DSC in the North Sea**

3.10 Norway (COMSAR 5/INF.12) informed the Sub-Committee on their operational and planned maritime VHF DSC base stations installed on oil rigs in the North Sea.

Norway has established GMDSS A1 sea areas along its extensive coastline since 1992. There are now 116 VHF base stations, and all of them have channel 70 (DSC), channel 16 and one or more duplex channels. The plan is to install 16 VHF base stations on Norwegian oil platforms in the North Sea for GMDSS communications in that area. 8 of these stations are already operational on a trial basis, and the official information on them will be given shortly.

When the planned installations are completed, the Norwegian A1 sea area will cover large parts of the North Sea. This will benefit the day-to-day general radio-communications, and of course be an important factor for distress and safety communications in the area.

## **OPERATIONAL AND TECHNICAL CO-ORDINATION PROVISIONS OF MARITIME SAFETY INFORMATION (MSI) SERVICES**

### **General**

3.11 The Sub-Committee noted that MSC 72 (MSC 72/23, paragraphs 9.3 to 9.5) had endorsed the Sub-Committee's action in developing and issuing COMSAR/Circ.20 on the List of NAVAREA Co-ordinators, had approved the following MSC circulars:

- .1 MSC/Circ.957 – Amendments to resolution A.706(17) on World-Wide Navigational Warning Service (WWNWS); and
- .2 MSC/Circ.958 – Amendments to the NAVTEX Manual,

and, in accordance with the amendments procedures prescribed for each document, had decided that they should enter into force on 1 January 2002.

3.12 The Sub-Committee briefly considered documents COMSAR 5/3/1 (Chairman, the NAVTEX Co-ordinating Panel), COMSAR 5/3/3 (IHO and WMO) and COMSAR 5/INF.7 (France) providing analysis of and recommendations for improving MSI services.

3.13 In considering document COMSAR 5/3/3 suggesting to define and adopt new NAVAREAs METAREAs for the Russian Arctic and subsequently to amend resolution A.706(17), the delegation of the Russian Federation, supported by Norway, proposed to postpone the consideration of the issue until the Russian Federation submits to the

Sub-Committee results of broadcast trials and a final proposal. The delegation pointed out that, with a view to provide reliable MSI services in such a special zone as Arctic, more studies and co-ordination on the national level, were needed.

3.14 With regard to the technical aspects for an extension of the SafetyNET broadcast capability, the Sub-Committee was advised by the Technical Working Group that it was possible to extend range of valid identities to 99. However, NAVAREAs/METAREAs far beyond 70° latitude coverage might be more suitable for NAVTEX transmissions.

### **Establishment of the Working Group**

3.15 Taking into account the above proposal by the Russian Federation and in order to consider in detail technical aspects of MSI services, the Sub-Committee established a Working Group (WG 1) under the Chairmanship of Mr. R. Swanson (United States) and instructed it to:

- .1 consider documents COMSAR 5/3/1, COMSAR 5/3/3 and COMSAR 5/INF.7; and
- .2 prepare a draft MSC circular on amendments to the International SafetyNET Manual, if necessary.

### **Report of the Working Group**

3.16 Having received the report of the Working Group (COMSAR 5/WP.3), the Sub-Committee approved the report in general and took action as indicated hereunder.

3.17 The report of the Working Group was available for review in English and French only. The delegation of Argentina whilst agreeing to discuss the report using the English text voiced its concern at the unavailability of the Spanish version and also stated that of late this state of affairs had occurred frequently.

3.18 The Sub-Committee noted that the NAVTEX service infrastructure continued to expand world-wide and the volume of information that each Administration disseminates through NAVTEX on frequency 518 kHz continued to increase. While the system currently provided a generally effective service, in an increasing number of geographical areas it was becoming over-loaded, with detrimental effects to both the promulgation of safety information and service levels to system users. This was apparent in the increasing instances of interference between stations with adjoining time slots due to over-running. The principal reasons for over-running are as follows:

- .1 a significant increase in safety-critical activity such as cable-laying. Navigation Warnings promulgating such activity often include numerous waypoints that are listed by latitude and longitude;
- .2 meteorological information provided in a manner which is not concise and easily assimilated by the system user or for a much wider area than is covered by the NAVTEX station;
- .3 additional information provided for non-SOLAS system users e.g. longer-range weather forecasts for fishing and recreational vessels; and

- .4 information to meet specific national requirements. This includes national language broadcasts and other information that is sometimes required to be broadcast by a national statute rather than IMO resolutions.

Interference between stations with the same time slot in different geographical areas also continues, occasionally due to short-term atmospheric conditions, but often due to excessive power output by some stations at night.

3.19 The Sub-Committee agreed a number of recommendations to Administrations aimed at reducing these interference problems and a volume of information and prepared a draft COMSAR circular on the International NAVTEX Service, given at annex 2, and invited the Committee to approve it.

3.20 The Sub-Committee also agreed that this circular be forwarded to IHO with a view to issuing an IHO Circular Letter on GMDSS matters for discussion at IHO Regional Hydrographic Commissions, and instructed the Secretariat to convey an appropriate COMSAR circular to IHO following approval by MSC 74.

3.21 The Sub-Committee further agreed that it was important now to encourage Administrations to migrate non-English language broadcasts and broadcasts of information provided specifically for non-SOLAS vessels from 518 kHz to 490 kHz or 4209.5 kHz, as appropriate. The Sub-Committee urged Administrations to complete this migration by 1 January 2005.

3.22 The Sub-Committee also noted the concerns regarding the quality of data transmitted, in some cases, reflecting a lack of awareness at the working level of the regulatory framework. A recent IHO-sponsored working group meeting in Oman went some way to address this problem by providing training for system operators in Oman's geographical region. Similar working group meetings could be beneficial in other areas in future.

3.23 The Sub-Committee, noting the concerns regarding the quality of data transmitted, in some cases on NAVTEX, which reflected a lack of awareness at the working level of the regulatory framework, invited the Committee to consider making the NAVTEX Manual and the International SafetyNET Manual more readily available, in the interest of operational safety, by placing these documents on the IMO web site.

3.24 The Sub-Committee was also informed about the advantages associated with putting the International SafetyNET Manual and the NAVTEX Manual on the IMO web site, namely:

- .1 it is the clear responsibility of those countries that choose to provide the International NAVTEX or SafetyNET services to do so in strict accordance with the standards and guidelines established by the Organization and supported by linked standards established by IHO and WMO;
- .2 IMO and IHO experts on missions to various countries have consistently reported that the key documents defining the operational standards for these services (NAVTEX Manual, IMO Publication No. 951 and the International SafetyNET Manual, IMO Publication No. 908) neither held by nor known to the officials responsible for the day-to-day operation of these services. This has an unacceptable impact on the operational efficiency and effectiveness of these services. In order to alleviate this difficulty, the Working Group strongly

recommends that these documents, in the interest of operational safety, be added to the IMO web site;

- .3 WWW is in common use and is the most efficient and effective method of publicizing organizations and their products and publications. It is a quick and user-friendly stratagem to obtain useful intelligence;
- .4 use of state-of-the-art dissemination of information, especially data of a safety-related nature;
- .5 ease by which information can be updated in a timely manner; and
- .6 use as an instructional tool web sites are cost-effective and can handle both textual and graphical formats.

3.25 The Sub-Committee was further informed that current technology could be used to provide a more ergonomic NAVTEX user interface, offering facilities to sort, store and display received safety information in a more user-friendly manner than the paper print-out. Change to the NAVTEX performance standards may be required to accommodate this new technology. The United Kingdom submitted a document to MSC 73 addressing this matter. It was not considered at that meeting, but if approved by MSC 74, changes to the performance standards could be considered at COMSAR 6.

3.26 The Sub-Committee further noted that during the forthcoming period the International NAVTEX Co-ordinating Panel would continue to liaise with WMO, IHO, ITU, the International SafetyNET Co-ordinating Panel and appropriate national Administrations. Its aim remained to assist Administrations to provide a consistent and concise world-wide Maritime Safety Information service which adequately met the needs of system users.

3.27 The Sub-Committee noted the document submitted by France (COMSAR 5/INF.7) outlining their participation in the World-Wide Navigational Warning Service (WWNWS). In particular, it noted that France, the NAVAREA II Co-ordinator, had taken an active role in addressing the poor level of GMDSS implementation in the southern part of the NAVAREA (Western Africa), especially the lack of MSI dissemination.

3.28 Due to a large number of changes to the telephone and Internet contact details, the Sub-Committee reviewed and amended COMSAR/Circ.20 - List of NAVAREA Co-ordinators and instructed the Secretariat to issue it as COMSAR/Circ.24. The Committee was invited to endorse the Sub-Committee's action.

#### **REVIEW OF THE JOINT IMO/IHO/WMO MSI MANUAL**

3.29 The Sub-Committee recalled that COMSAR 3 had amended the Joint IMO/IHO/WMO Manual on MSI and had instructed the Secretariat to disseminate it by means of COMSAR/Circ.15, revoking COMSAR/Circ.4. MSC 69 had endorsed the Sub-Committee's action.

3.30 It was noted that, as recommended by COMSAR 4, MSC 72 (MSC 72/23, paragraph 21.31) had included the item "Review of the Joint IMO/IHO/WMO MSI Manual" in the provisional agenda for COMSAR 5.

3.31 Noting that no documents had been submitted on the issue to this session, the Sub-Committee recalled that France had submitted to COMSAR 4 document COMSAR 4/8/3 and Corr.1 on Clarification of the relationship between SAR and MSI services, which had been considered by the Sub-Committee and supported, in general, by a number of delegations. However, no action had been taken on the proposed amendments to:

- .1 resolution A.705(17) – Promulgation of maritime safety information (MSI); and
- .2 the Joint IMO/IHO/WMO Manual on MSI,

because the Sub-Committee had not been authorized to consider the issue as the work programme item “Review of the Joint IMO/IHO/WMO Manual on MSI” had not been included in the provisional agenda for COMSAR 4.

3.32 Having discussed document COMSAR 4/8/3 and Corr.1 in general, the Sub-Committee decided to instruct the Working Group (WG 1) to:

- .1 consider document COMSAR 4/8/3 and Corr.1; and
- .2 review the Joint IMO/IHO/WMO Manual on MSI, with a view to issue it as an IMO publication.

### **Report of the Working Group**

3.33 Having received the report of the Working Group (COMSAR 5/WP.3), the Sub-Committee took action as indicated hereunder.

3.34 As recommended in paragraph 3.2 of COMSAR 5/1/1, the Sub-Committee considered the documents submitted by France (COMSAR 4/8/3 and Corr.1, annex 2) and advice from IHO and WMO and agreed draft amendments to the Joint IMO/IHO/WMO Manual on MSI (COMSAR/Circ.15), given at annex 3, and invited the Committee to approve them and subsequently instruct the Secretariat to issue the amended Manual as an IMO publication due to its usefulness and importance.

3.35 The Committee was also invited to delete the item “Review of the Joint IMO/IHO/WMO MSI Manual” from the Sub-Committee’s work programme, as the work on it had been completed.

## **HARMONIZATION OF GMDSS REQUIREMENTS FOR RADIO INSTALLATIONS ON BOARD SOLAS SHIPS**

### **General**

3.36 The Sub-Committee recalled that MSC 71 had discussed document MSC 70/20/3 (Ireland) proposing to consider developing internationally agreed harmonized guidelines for GMDSS installations and had decided to include, in the Sub-Committee’s work programme, a low priority item on “Harmonization of GMDSS requirements for radio installations on board SOLAS ships”, with 2 sessions needed to complete the work.

3.37 The Sub-Committee noted that, as suggested by COMSAR 4, MSC 72 (MSC 71/23, paragraph 20.23) had decided to include this agenda item into the provisional agenda for COMSAR 5.

3.38 The Sub-Committee, noting that no substantial proposals had been received on the matter for this session, decided to instruct the Working Group to:

- .1 consider documents (MSC 70/20/3, COMSAR 5/3/4 (Norway) and COMSAR 5/INF.11 (Canada) related to the installations of GMDSS equipment on board ships; and
- .2 prepare recommendation on further steps to be taken in developing harmonized guidelines for GMDSS installations.

### **Report of the Working Group**

3.39 The Sub-Committee considered the report of the Working Group (COMSAR 5/WP.3) and took action as indicated hereunder.

3.40 With respect to document COMSAR 5/3/4 (Norway) asking for the interpretation of the term “occasionally” as mentioned in paragraph 2.1.2 of resolution A.702(17) when used in connection with the implementation of the GMDSS on fishing vessels, the Sub-Committee concurred with the Working Group's opinion that the term “occasionally” had to be interpreted by individual Administrations, taking into account all relevant safety aspects.

3.41 The Sub-Committee noted the information provided by Canada (COMSAR 5/INF.11) on matters relating to radiocommunications and search and rescue issues resulting from the sinking of the bulk carrier ‘Flare’ on 16 January 1998.

### **OTHER GMDSS MATTERS**

#### **Development of maritime radiocommunication systems and technology; Bridge-to-bridge radio-communications**

3.42 The Sub-Committee recalled that, at its fourth session, it had noted document COMSAR 4/11 and Corr.1 (France), proposing to include in the Sub-Committee's work programme a new item on “Developments in maritime radiocommunication systems and technology”, which was supported in principle by a number of delegations, and had invited France to submit their proposal to the Committee for consideration and action, as appropriate.

3.43 The Sub-Committee noted that MSC 72 (MSC 72/23, paragraphs 21.34 and 21.35) had considered a proposal by France (document MSC 72/21/2) to include, in the Sub-Committee's work programme, a continuous item under which information on developments in maritime radiocommunication systems and technology can be collected and analysed with a view to assess the overall situation and take action, as appropriate. Having recalled resolution A.606(15) on Review and evaluation of the GMDSS, by means of which the Committee had been requested to review and evaluate any experience gained with the GMDSS and determine, whether there is a need to adjust the system's requirements, MSC 72 agreed to invite the delegation of France to submit any additional information to MSC 73 for reconsideration together with the proposal submitted to MSC 72 and also to consider submitting simultaneously the same proposal to COMSAR 5 for consideration subject to positive outcome of MSC 73.

Having considered document MSC 72/21/3 whereby France was suggesting consideration of “bridge-to-bridge radio-communications”, one of the functions of the GMDSS, MSC 72 also decided to invite the delegation of France to submit any additional information to MSC 73 for reconsideration together with the proposal submitted to MSC 72 and also to consider submitting simultaneously the same proposal to COMSAR 5 for consideration, subject to positive outcome of MSC 73.

3.44 The Secretariat informed the Sub-Committee that France had not submitted any additional information on their proposals for new agenda items to MSC 73 for consideration, and that the Committee, at its seventy-third session, had not considered any documents proposing new agenda items for the work programmes of all sub-committees, due to time constraints.

3.45 In order to facilitate the consideration of the proposed new agenda items for inclusion in the Sub-Committee’s work programme, the Sub-Committee instructed the Working Group (WG 1) to:

- .1 consider documents COMSAR 5/3 and COMSAR 5/4 submitted by France; and
- .2 prepare a preliminary assessment of the proposals in accordance with the provisions of paragraph 16 of the Guidelines on the organization and method of work of the MSC and the MEPC and their subsidiary bodies (MSC/Circ.931 – MEPC/Circ.366).

### **Report of the Working Group**

3.46 Having considered the report of the Working Group (COMSAR 5/WP.3), the Sub-Committee was of the opinion that there was a need to put these issues in the work programme and in the provisional agenda for COMSAR 6 and invited France to resubmit their proposals to MSC 74 for consideration. The Committee was invited to note the Sub-Committee’s opinion on the matter.

### **COMSAR/Circ.21 and COMSAR/Circ.2**

3.47 The Sub-Committee noted that MSC 72 (MSC 72/23, paragraph 9.9) had endorsed the Sub-Committee's action in:

- .1 issuing COMSAR/Circ.21 on Procedure for responding to DSC distress alerts by ships, intended to reduce false distress alerts; and
- .2 instructing the Secretariat to convey COMSAR/Circ.21 and paragraphs 3.42 to 3.50 of document COMSAR 4/14 to the ITU-R Working Party 8B for information and appropriate action.

3.48 The Sub-Committee recalled that, at its fourth session, it had prepared COMSAR/Circ.21 on Procedures for responding to DSC distress alerts by ships on VHF, MF and HF frequencies. However, COMSAR 4 did not mention the obsolete COMSAR/Circ.2 which should be revoked.

3.49 The Sub-Committee considered document COMSAR 5/3/2 (Russian Federation) drawing the attention to the above fact and instructed the Secretariat to prepare a revised COMSAR/Circ.21 with two annexes, one covering VHF/MF procedures and the second for HF

procedures and revoke COMSAR/Circ.2 and COMSAR/Circ.21 and issue it as COMSAR/Circ.25.

3.50 The Committee was invited to endorse the Sub-Committee's action.

#### **Draft amendments and adjustments to SOLAS chapter IV**

3.51 The Sub-Committee recalled that, at its fourth session, noting that paragraph 2.3 of SOLAS regulation IV/3 (Exemptions) was not applicable any more after 1 February 1999, it had invited the Committee to authorize it to prepare the necessary amendments.

3.52 MSC 72, having noted that some regulations of SOLAS chapter IV, such as regulations IV/3.2.3 (Exemptions), IV/7.2, 7.3 and 7.4 (Radio equipment: General) and IV/12.4 (Watches) are no longer applicable as of 1 February 1999, had authorized COMSAR 5 to prepare appropriate draft amendments and/or adjustments to chapter IV under its agenda item on "Global Maritime Distress and Safety System" for further consideration by the Committee (MSC 72/23, paragraph 9.6).

3.53 The Sub-Committee noted that MSC 72 (MSC 72/23, paragraph 9.8) had endorsed the Sub-Committee's action taken at its fourth session in instructing the Secretariat to prepare draft amendments to SLS.14/Circ.115 on the Issue of Exemption Certificates under the 1974 SOLAS Convention and amendments thereto, and had approved the proposed amendments for circulation as SLS.14/Circ.115/Add.2.

3.54 The Sub-Committee reviewed regulations IV/3.2.3 (Exemptions), IV/7.2, 7.3 and 7.4 (Radio equipment: General) and IV/12.3 and 12.4 (Watches) which are no longer applicable as of 1 February 1999. It also decided to delete paragraphs 3 to 7 of Regulation 1 and instructed the Secretariat to review and update references to the relevant MSC and Assembly Resolutions.

3.55 The Sub-Committee agreed that the afore-mentioned regulations could be deleted from SOLAS chapter IV, and forwarded them to the Committee along with the associated draft MSC resolution for approval and adoption, as appropriate. The proposed amendments are given at annex 4.

3.56 The Sub-Committee further instructed the Secretariat to prepare draft amendments to the Passenger Ship Safety Certificate, Cargo Ship Safety Equipment Certificate, Cargo Ship Safety Radio Certificate and Cargo Ship Safety Certificate and the Record of Equipment Forms P, E, R and C set out in the Appendix to SOLAS 74, as amended and the 1988 SOLAS Protocol to be approved by MSC 74 for circulation and adoption together with the proposed amendments to SOLAS chapter IV.

#### **Review of the standard message format for piracy attacks and alerts (appendix 2 to MSC/Circ.623/Rev.1)**

3.57 The Sub-Committee noted that MSC 72 had requested the Sub-Committee to consider the standard message format for piracy attacks and alerts contained in appendix 2 to MSC/Circ.623/Rev.1 (annex 6 to annex 2 to document MSC 72/17/2) and to report to MSC 74, as appropriate (MSC 72/23, paragraph 17.11).

3.58 The Secretariat informed the Sub-Committee that annex 6 to document MSC 72/17/2 contains resolutions adopted by the regional seminar and workshop on piracy and armed robbery against ships held in Lagos, Nigeria in October 1999. By operative paragraph 4 of resolution 1 –

Prevention and suppression of piracy and armed robbery against ships it is recommended that *the standard message format for piracy attacks and alerts contained in appendix 2 to MSC/Circ.623/Rev.1 should be reviewed and, as appropriate, further developed.*

3.59 The Sub-Committee reviewed the standard message format for piracy attacks and alerts (Appendix 2 to MSC/Circ.623/Rev.1) and was of the opinion that there was no need for any amendment and invited the Committee to take note of this recommendation.

## **4 DEVELOPMENT OF CRITERIA FOR GENERAL COMMUNICATIONS**

### **General**

4.1 The Sub-Committee recalled that:

- .1 COMSAR 3 had noted that some Administrations indicated their intention to close their coast station facilities for public correspondence on VHF and MF. The Sub-Committee briefly discussed the matter and was of the opinion that criteria for general radio-communications in such well defined areas could possibly be developed (COMSAR 3/14, paragraphs 3.22 to 3.25);
- .2 MSC 69 had agreed to the proposal by COMSAR 3 to include, in the Sub-Committee's work programme, a low priority item on "Development of criteria for general communications", with 2 sessions needed to complete the item; and
- .3 COMSAR 4 had considered contributions on aspects related to general communications (COMSAR 4/3 (Denmark), COMSAR 4/3/1 (France), COMSAR 4/3/15 (ICS) and COMSAR 4/5/1 (United States)). The Sub-Committee gave preliminary consideration to this topic and agreed (COMSAR 4/14, paragraphs 3.59 to 3.60) to invite the MSC to include in the provisional agenda for COMSAR 5 the work programme item "Development of criteria for general communications" with high priority and invited Members to submit their comments and proposals on these matters to COMSAR 5 for consideration.

4.2 The Sub-Committee noted that MSC 72 had changed the priority of the work programme item "Development of criteria for general communications" and included this item in the provisional agenda for COMSAR 5.

4.3 The Sub-Committee considered and briefly discussed document COMSAR 5/4/1 (France) providing an overview of general communications and proposing to modify a definition of "general communications"; and a joint submission by Denmark and Finland (COMSAR 5/4/2) providing some consideration on the issue and proposing to develop guidelines on allowing the use of alternative communication systems for general radiocommunications.

### **Establishment of a Working Group**

4.4 In order to consider the above proposals and comments in detail, the Sub-Committee established a Working Group (WG 3) under the Chairmanship of Mr. E. Blikrud (Norway), with the following terms of reference:

- .1 to consider documents COMSAR 5/4/1 and COMSAR 5/4/2; and
- .2 to review definition of “general radiocommunications”, if necessary.

### **Report of the Working Group (WG 3)**

4.5 Having received the report of the Working Group (COMSAR 5/WP.5), the Sub-Committee approved the report in general and took action as indicated hereunder.

4.6 The Sub-Committee noted that the group had considered documents COMSAR 5/4/1 and COMSAR 5/4/2 and had agreed that general radiocommunications means operational and public correspondence traffic and safety and safety-related communications as elaborated by ITU Radio Regulation S.33 not otherwise included in regulation SOLAS IV/2.1.5.

4.7 The Sub-Committee also noted that the group had recognized that complying with the carriage requirements as defined in the SOLAS Convention, ship installations fulfil the requirement for general radio-communications facilities. If no facilities for general communications in the terrestrial GMDSS systems are established on shore in an A1 or A2 sea area, ships in these areas need additional equipment in order to fulfil the SOLAS functional requirements for general communications. If no additional equipment for general radio-communications is to be added, the SOLAS Convention should be amended accordingly.

4.8 It was pointed out that general radio-communications in A1 or A2 sea areas may be provided by systems and equipment other than the normal GMDSS equipment. If general radio-communication systems other than those referred to in the SOLAS Convention are established, there might be no performance requirements to the systems.

4.9 It was also pointed out that development of criteria for general radio-communications could provide valuable guidance for Administrations when accepting systems for public correspondence, but such criteria should not be mandatory.

4.10 The Sub-Committee, noting that the group could not finalize the work on a definition of general radiocommunications and recognizing that this issue should be further considered at its next session, invited Member Governments to submit their proposals and comments to COMSAR 6 for further consideration.

## **5 ITU MARITIME RADIOCOMMUNICATION MATTERS**

### **RADIOCOMMUNICATION ITU-R STUDY GROUP 8**

5.1 The Sub-Committee was informed that the Secretariat, as instructed by COMSAR 4, had conveyed COMSAR/Circ.21 on Procedure for responding to DSC distress alerts by ships, intended to reduce false distress alerts and paragraphs 3.42 to 3.50 of document COMSAR 4/14 to the ITU-R Working Party 8B for information and appropriate action. The IMO liaison statement to WP 8B was issued as document 8B/3-E.

### **ITU WORLD RADIOCOMMUNICATION CONFERENCE**

5.2 The Sub-Committee recalled that, as authorized by MSC 69, COMSAR 4 had prepared the IMO position on WRC-2000 agenda items concerning maritime matters and had instructed the Secretariat to submit it, as adjusted in the light of proposals made at NAV 45 (NAV 45/14,

paragraphs 8.4 and 8.5) and the outcome of the second session of the Conference Preparatory Meeting (CPM), directly to the ITU Conference for consideration.

5.3 The Sub-Committee was informed that the IMO position was eventually submitted to CPM-99, held in November 1999, and issued as document CPM 99-2/33. Subsequently, an adjusted IMO position was conveyed to the Secretary-General of ITU with the request that it be submitted to WRC-2000 (Istanbul, Turkey, 8 May to 2 June 2000), for consideration. The IMO position was issued by ITU as "IMO information paper" under symbol CMR 2000/92. The IMO Secretariat participated in the Conference as an observer.

5.4 The Sub-Committee noted that MSC 72 had been informed that the Steering Committee of WRC-2000, by document CMR 2000/195 of 12 May 2000, had, *inter alia*, agreed on a number of principles relating to the handling of information documents and statements, submitted by observers, and the Conference had been notified that, in accordance with the ITU Convention, observers from the United Nations, regional telecommunication organizations, intergovernmental organizations operating satellite systems, the specialized agencies of the United Nations and international organizations might participate in a conference or a meeting of the Union but only in an advisory capacity. The right to submit proposals to the Conference was exclusively reserved for Member States. However, in line with the practice of ITU and also of the common system as a whole, observers might submit written contributions in the form of information documents only.

Information documents did not constitute proposals and should not therefore be listed as documents allocated to items of the agenda of a meeting. Information documents should be referenced at the bottom of the page of an agenda for information purposes only. The agenda item could be annotated with a footnote or an asterisk to indicate that an information document listed at the bottom of the page contains information related to that agenda item.

The right to express opinions freely and fully on any subject under debate, which is provided for in No. 16 of the ITU Rules of Procedure of Conferences and other Meetings, was **granted solely** to Member States. Accordingly, observers in their advisory capacity, might be given the floor only at the discretion of the chairperson. When given the floor, the observer should not make any proposals but provide information relevant to the item under discussion.

5.5 The Sub-Committee also noted that, in the light of the aforementioned information, MSC 72, considering that, for serious reasons pertaining to maritime safety, there was a need for harmonized international maritime communications standards, which should be internationally recognized and protected, had undertaken certain actions as indicated in paragraph 9.14 of its report (document MSC 72/23).

5.6 The Sub-Committee further noted that MSC 72 had endorsed the Sub-Committee's action in:

- .1 inviting ICAO to co-operate with the Organization in addressing how changes made at WRC-97 might be amended at a future WRC; and
- .2 instructing the Secretariat to take appropriate action as required.

The Committee was informed that the Secretary-General had communicated with the Secretary-General of ICAO stressing the need for, and importance of, protecting safety-related

services, such as maritime and aeronautical radiocommunications, radionavigation, COSPAS-SARSAT and other relevant issues, and inviting ICAO's co-operation on these matters.

5.7 The Sub-Committee noted that, in considering document MSC 73/20/4 (Secretariat) on the outcome of WRC 2000, MSC 73 had noted that:

- .1 as instructed by the Committee, the Secretariat had submitted the technical outcome of WRC-2000, containing a partial revision of the Radio Regulations, recommendations and resolutions dealing with maritime matters, to COMSAR 5 (COMSAR 5/5), for consideration and action as appropriate with a view to it reporting to MSC 74;
- .2 MSC 72 had invited the Legal Committee to comment and advise on the status of documents and oral interventions by United Nations specialized agencies under the International Telecommunication Union (ITU) Conference Rules of Procedure. To that end the Secretariat had submitted document LEG 82/10/2 with attachment CMR 2000/195 to the eighty-second of the Legal Committee (16 to 20 October 2000), for consideration; and
- .3 the IMO position presented to WRC-95 and WRC-97 had been issued by ITU as "information documents", which, however, had been presented by an IMO observer and discussed on all appropriate meetings of the two Conferences including Plenary sessions (refer to paragraph 6, document MSC 73/20/4).

With regard to the MSC 72's invitation mentioned in paragraph .2 above, the Committee was informed by the Secretariat (document MSC 73/2/3, paragraphs 6 and 7) that "the Legal Committee had agreed that it was the prerogative of each Specialized Agency to decide on its own rules of procedure regarding the interventions of observers and the submission of documents and proposals. ITU was therefore entitled to restrict the right to submit proposals to its conferences to Member States only and to require documents submitted by observers to be issued in the form of information documents, although neither of these is IMO practice."

5.8 The Sub-Committee, recalling the opening remarks by the Secretary-General, was informed that MSC 73, taking into account the above information and comments made by the delegation of Cyprus (mainly that the Committee should consider the technical aspect of the issue, leaving any policy aspects to the Council), had been of the opinion that, within ITU, the status of the United Nations specialized agencies dealing with safety-related matters and protection of human lives, such as ICAO, IMO and WMO, should be distinguished from the status of other international organizations and sector Members, which are private companies and had:

- .1 urged Member Governments, when developing national positions on radio and telecommunications for discussion at various ITU fora, to ensure that the maritime interests and needs, as developed and identified by IMO, are duly covered and protected;
- .2 invited the Secretary-General, taking into account the advice provided, to communicate with the Secretary-Generals of ITU and ICAO on the matter of co-operation between United Nations specialized agencies on protecting safety-related services, such as maritime and aeronautical radiocommunications, radionavigation, IMSO, COSPAS-SARSAT and other relevant issues; and

- .3 recommended Member Governments and the Secretariat to actively participate in the work of ITU Study Groups, Working Parties and regional telecommunication organizations dealing with maritime communications.

5.9 The Sub-Committee considered the technical outcome of WRC-2000 (COMSAR 5/5) submitted by the Secretariat; document COMSAR 5/5/1 (United Kingdom) on numbering requirements for future mobile-satellite systems intending to participate in the GMDSS; COMSAR 5/5/2 (Norway) on the use of digital technology in the maritime VHF frequency band; COMSAR 5/5/3 (Netherlands) proposing to amend Article S 33 of the ITU Radio Regulations regarding the announcement of safety messages by using DSC; and COMSAR 5/5/4 (United Kingdom) on protecting the maritime radar frequency bands within ITU.

### **Terms of reference for the Working Group (WG 3)**

5.10 With a view to consider the above proposals and comments made, the Sub-Committee instructed the Working Group established under agenda item 4 (paragraph 4.4) to:

- .1 consider documents COMSAR 5/5, COMSAR 5/5/1, COMSAR 5/5/2, COMSAR 5/5/3 and COMSAR 5/5/4;
- .2 analyse and comment on the outcome of WRC-2000;
- .3 prepare draft appropriate liaison statements to WP 8B, Task Group 1-5 and Study Group 2; and
- .4 prepare a draft preliminary IMO position on maritime matters to WRC-03 tentatively scheduled to be held in June-July 2003.

### **Report of the Working Group**

5.11 Having received a report of the Working Group (COMSAR 5/WP.5), the Sub-Committee approved the report in general and took action as indicated hereunder.

### **Exhaustion of MMSI numbers**

5.12 The Sub-Committee noted that the MMSI resource is, in principle, sufficient for all existing mobile systems participating in the GMDSS provided that simple administrative measures are applied to conserve the numbering resource. There could be an adverse impact on the MID resource but only if the existing regional numbering structure is maintained.

5.13 It was also noted that the MMSI resource is not sufficient to cater for additional mobile-satellite systems if the original practice of embedding MIDs and MMSIs within the ship telephone number is continued. The introduction of free form numbering would facilitate the participation of future generations of mobile-communication systems in the GMDSS.

5.14 The Sub-Committee concurred with the United Kingdom's proposal on amending the Radio Regulations to clarify numbering for future satellite systems which could participate in the GMDSS and agreed a COMSAR circular on operational and service implications for numbering plan formats for mobile-satellite systems participating in the GMDSS and instructed the Secretariat to issue it as COMSAR/Circ.26. The circular is intended to assist Administrations when preparing contributions to relevant ITU Study Groups. Member Governments were invited

to urge their national delegations to the ITU to support the proposals when they are available. The Maritime Safety Committee was invited to endorse the Sub-Committee's action.

### **Threat to the radar spectrum**

5.15 In considering COMSAR 5/5/4 on spectrum for maritime navigational radars, the Sub-Committee noted that maritime navigational radars have used the frequency bands 2.9-3.1GHz and 9.2-9.5 GHz on a primary basis for a long time, but realized that sharing studies are now taking place. The group also noted the studies within the ITU regarding spurious emissions and out-of-band emissions from radars.

5.16 The Sub-Committee, while welcoming actions leading to efficient use of the frequency spectrum, noted a concern that it might take some time to modify radar equipment to implement changes in the present requirements. Radars meeting IMO requirements have to have narrow pulses which lead to wide spectrum. New technology radars using non-pulse signals may lead to unwanted consequences like failure in triggering SARTs and racons. The technical consequences of changes in the present radar requirements as well as introducing sharing with other services should be thoroughly studied before any changes are made.

5.17 Bearing in mind that the Sub-Committee on Safety of Navigation was competent to consider radar-related issues, the Sub-Committee agreed to invite the Committee to note the continued threat to the spectrum being used by maritime navigational radars and instruct the NAV Sub-Committee to review the relevant current requirements in co-operation with the Sub-Committee. A note to the NAV Sub-Committee, as prepared by the group and modified by plenary, is set out in annex 5, to which special attention of the NAV Sub-Committee should be drawn.

5.18 Recognizing that sharing studies are taking place in several fora, the Sub-Committee also agreed to invite Member Governments to co-ordinate their activity in IMO and ITU in order to support the relevant maritime interests and IMO views in ITU and make maritime radar experts available for ITU meetings whenever radar spectrum matters are considered.

### **IMO position on maritime matters to WRC-03**

5.19 The Sub-Committee noted that, due to lack of time, the group could not analyse and comment on the outcome of WRC-2000 and prepare a draft IMO position on maritime matters to WRC-03 and would continue its work on the matter at the next session of the Sub-Committee.

### **Establishment of a correspondence group**

5.20 In order to progress the work intersessionally, the Sub-Committee agreed to established a correspondence group on ITU WRC matters under the co-ordination of the Secretariat\* with the following terms of reference:

- .1 taking into account the work done at COMSAR 5, to analyse and comment the outcome of WRC-2000;

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- .2 to prepare a preliminary draft IMO position on maritime matters to WRC-03 tentatively scheduled to be held in June-July 2003; and
- .3 to submit a report to COMSAR 6 for consideration.

## **6 SATELLITE SERVICES (INMARSAT AND COSPAS-SARSAT)**

### **General**

6.1 The Sub-Committee recalled that, as authorized by MSC 70, COMSAR 4 had finalized the draft Assembly resolution on Criteria for the provision of mobile-satellite communication systems for the Global Maritime Distress and Safety System (GMDSS) and had submitted it directly to the twenty-first session of the Assembly for adoption; and that the draft resolution was brought to the attention of IMSO. It was noted that the draft resolution was subsequently adopted, with certain amendments, as resolution A.888(21).

### **INMARSAT SERVICES**

6.2 The Sub-Committee noted that, by document MSC 72/INF.15, IMSO had informed MSC 72 on the performance of Inmarsat Ltd. concerning its obligations for the provision of maritime services relating to the GMDSS under the supervision of IMSO. The information covers the period since the privatization of Inmarsat on 15 April to 31 December 1999. It assesses that, during that period, Inmarsat Ltd. has continued to provide a sufficient quality of service to meet its obligations under the GMDSS.

Referring to paragraph 4.6 of document MSC 72/INF.15, the ICFTU observer expressed concern about possible delays in the restoration of full GMDSS services, were a prime satellite to fail. ICFTU invited IMSO to provide details on further information and clarifications they obtained from Inmarsat to COMSAR 5, for consideration.

6.3 The Sub-Committee noted documents COMSAR 5/6 and COMSAR 5/6/Add.1 whereby IMSO had provided information on the performance by Inmarsat Ltd., with regard the company's obligations for the provision of maritime services within the GMDSS. The information covered the period since privatization of Inmarsat on 15 April 1999 to 31 August 2000.

In particular, IMSO informed the Organization of the operational status and performance of the Inmarsat's network and provided an analysis on the Inmarsat's existing services and future plans. It assessed that the operations of Inmarsat Ltd., have continued to provide a sufficient quality of service within the GMDSS to meet the company's obligations under the terms of the Public Services Agreement. The company had reacted quickly and positively to correct any problems or shortcomings that had become apparent in the operation of the GMDSS services. In particular, the company had responded quickly and comprehensively to amend certain operating procedures dealing with the restoration of GMDSS services, following two live incidents that had showed some shortcomings in the procedures previously in force.

The business of maintaining and developing commercial mobile-satellite communication services continued to be a particularly volatile environment and it was increasingly difficult to foresee the shape of the industry more than a short period in advance. There was a continuing process of rationalisation and centralisation in the mobile-satellite communication industry. IMSO could foresee developments in communication methods and media in the near future that would drive

the introduction of new satellites and services for the business market but which may not be of immediate benefit to mariners. In this situation, IMSO believed it would be vital for the Sub-Committee to establish a mechanism for the periodical review to maintain the currency and relevance of resolution A.888(21) - Criteria for the provision of mobile-satellite communication systems in the Global Maritime Distress and Safety System (GMDSS).

In the same way, there was continuing pressure on spectrum, numbering and related issues within the ITU. IMSO believed it would be essential for the international maritime community to maintain a close working relationship with the ITU so as to ensure that proper account is taken of the needs of mariners in this regard over the coming years.

For the present, the arrangements which had been put in place to preserve the vital interests of the global maritime community in the provision of distress, safety and general communications appeared to be working satisfactorily.

6.4 The Sub-Committee noted that, in respect of the concern expressed by the ICFTU observer at MSC 72 about possible delays in the restoration of full GMDSS services were a prime satellite to fail (COMSAR 5/6 paragraph 4.2 and MSC 72/23 paragraph 9.37), Inmarsat Ltd., had reviewed and revised its procedures for restoring GMDSS services in the event of prime satellite failure. These revised procedures had in turn been reviewed by IMSO.

Whilst there were no IMO criteria defining the performance required of Inmarsat Ltd., in relation to existing services, Inmarsat's procedures provided for the restoration of GMDSS satellite distress and safety services within the time-scales required for new services by resolution A.888(21). Whilst the procedures had been improved in the light of recent experience and to take account of the current disposition of Inmarsat's constellation, target restoration times were unchanged from those which had been in place before the privatization of Inmarsat.

IMSO was developing, in co-operation with Inmarsat Ltd., practical methods of exercising these procedures to ensure that they were fully effective and key personnel knew how to implement them. Some aspects of the procedures, particularly those that involve the movement of satellites in space, could not reasonably be exercised, and the efficiency of these measures was being assessed by analytical methods and detailed discussion with those involved.

6.5 The Sub-Committee also noted with interest that Inmarsat Ltd. had brought into use an automated distress alert monitoring capability to provide quantitative statistical data on the number of distress priority alerts, calls and messages handled by the systems. For the first time figures have been produced for each month of the year 2000 and are shown in the appropriate tables of document COMSAR 5/6/Add.1.

### **Installation of Inmarsat terminals on non-Convention vessels**

6.6 The Sub-Committee considered document COMSAR 5/6/4 (France) supporting the recommendation made by IMSO (COMSAR 5/6/Add.1, paragraphs 5.1 to 5.3) that the attention of national maritime Administrations should be drawn to the fact that improper installation of Inmarsat-C terminals on non-SOLAS vessels could have harmful consequences.

6.7 In this context, the Sub-Committee recalled that, by MSC/Circ.861 of 22 May 1998 on Measures to reduce the number of false distress alerts, MSC 69, noting that the large number of non-Convention ships which are expected to fit GMDSS equipment in the coming years and recognizing that false distress alerts already impose a considerable burden on Rescue Co-ordination Centres (RCCs) and divert SAR resources away from real distress situations and

therefore also reduce the confidence of seafarers, had urged Member Governments, among other actions, *to ensure that all GMDSS equipment being manufactured and installed on ships comply fully with the latest IMO performance standards including, where relevant, a dedicated and protected distress button as the only means of initiating a distress alert.*

6.8 Following discussion of the above, the Sub-Committee was of the opinion that the issue had already been addressed by MSC/Circ.861. However, the Sub-Committee concurred with the proposals by IMSO and France and invited Member States to draw the attention of the relevant Administrations to consider the matter again and, if possible, draw up a national legislation, if such legislation does not already exist, which for non-SOLAS vessels, should require that Inmarsat equipment should be installed in accordance with the standards specified by Inmarsat Ltd.

### **COSPAS-SARSAT SERVICES**

6.9 The Sub-Committee noted information provided by COSPAS-SARSAT (COMSAR 5/6/1) on the status of the COSPAS-SARSAT programme and recent developments in the system, including preparations for the future phase-out of the 121.5 MHz satellite alerting capability and the assignment of new frequency channels in the 406.0 – 406.1 MHz frequency band. Some of this information is given hereunder.

#### **Future phase-out of 121.5 MHz Satellite Alerting Service**

121.5 MHz beacons are available at a very low cost, but this out-dated technology, which cannot be improved easily, is the source of a very large number of false alerts (over 98% of all 121.5 MHz COSPAS-SARSAT distress alerts). Although these devices are not accepted as part of the GMDSS, they are installed on board a large number of aircraft and are used at sea on board small craft and fishing vessels. The absence of an automatic capability for identifying 121.5 MHz alerts is also a serious limitation of the 121.5 MHz system which significantly increases the workload of Rescue Co-ordination Centres. This situation impacts on the efficiency of SAR operations and has led to a request by IMO for a termination of COSPAS-SARSAT processing of 121.5 MHz signals.

In 1999, the Council of the International Civil Aviation Organization (ICAO) adopted amendments to the annexes of the ICAO Convention requiring all new aircraft from 2002, and all aircraft from 2005, under the jurisdiction of the ICAO Convention, to carry an Emergency Locator Transmitter (ELT) operating on 406 MHz, and 121.5 MHz for homing purpose. The ICAO Council also agreed that COSPAS-SARSAT processing of 121.5 MHz ELTs could be discontinued from 2008.

In response to the request of IMO and following the agreement of ICAO, the COSPAS-SARSAT Council decided at its CSC-23 Session, in October 1999, that future satellites from COSPAS-13 (planned for launch from 2006) and SARSAT-14 (planned for launch from 2009) would not carry the 121.5 MHz search and rescue repeater (SARR) instrument. However, it should be noted that all COSPAS satellites to be launched prior to COSPAS-13, and all SARSAT satellites to be launched prior to SARSAT-14 will be equipped with the 121.5 MHz SARR.

The COSPAS-SARSAT Council approved, in October 2000, a comprehensive Phase-Out Plan for 121.5/243 MHz satellite alerting services, with a planned cut-off date of 1 February 2009, to assist Participants in the System, as well as Administrations and users, in their preparation for the discontinuation of this service. As part of the preparations for the phase-out of 121.5 MHz satellite alerting, Administrations should develop information campaigns to ensure that all appropriate

users, regulatory bodies and manufacturers concerned are kept informed of the progress of the phase-out.

About 600,000 beacons operating at 121.5 MHz will have to be replaced either by 406 MHz equipment or other means of alerting, prior to the planned cut-off date of the 121.5 MHz satellite alerting service. Therefore, a major aspect of the phase-out preparation is to ensure the availability of 406 MHz ELTs/EPIRBs for use as replacement of the 121.5 MHz beacons, and the management of the 406 MHz beacon population growth prior to the cut-off date. Preliminary studies have indicated that the COSPAS-SARSAT GEOSAR and LEOSAR systems had sufficient capacity to accommodate a significant growth of the 406 MHz beacon population, provided the carrier frequency was adequately spread over the assigned bandwidth (i.e. 406.0 - 406.1 MHz).

### **New frequency channels in the 406 MHz band**

Recognizing the continued growth of the number of 406 MHz beacons and the impact that this may have on the capacity of GEOSAR system due to a lack of frequency spreading, the COSPAS-SARSAT Council decided that the carrier frequency of new models of operational 406 MHz beacons should be moved to 406.028 MHz. The modified beacon specification stipulates that 406 MHz beacons submitted for type approval after 1 January 2000 can be set to operate at the new frequency, and that after 1 January 2002 all beacons submitted for type approval must be set to transmit at 406.028 MHz. Beacon models type approved before this date may continue to be produced and operate at 406.025 MHz.

To provide for future growth of the 406 MHz beacon population and ensure efficient management of the use of available spectrum in the 406.0 - 406.1 MHz frequency band, COSPAS-SARSAT is developing a 10-year 406 MHz Channel Assignment Plan. The plan will define the frequency channels in which new beacon models submitted for COSPAS-SARSAT type approval testing in future years will be required to operate. Its purpose is to ensure that the carrier frequencies of beacon models in production will be appropriately spread in the 406.0 - 406.1 MHz frequency band, and that the capacity of each channel is not exceeded.

IMO's technical requirements for the 406 MHz EPIRB signal are detailed in the ITU Recommendation ITU-R M.633. In May 2000, the ITU Radiocommunication Assembly approved revision 2 of ITU-R M.633. The revised recommendation makes reference to COSPAS-SARSAT document C/S T.001 ("Specification for COSPAS-SARSAT 406 MHz Distress Beacons", Issue 3 - Revision 2, dated October 1998) in respect of 406 MHz EPIRBs electrical requirements. Therefore, 406 MHz EPIRBs produced to operate at 406.028 MHz conform to IMO's technical requirements. However, a contradiction in IMO Assembly resolution A.810(19) on Performance standards for 406 MHz EPIRBs, which results from the amendment to the ITU Recommendation, needs to be addressed.

To allow for additional frequency channels in future, as will be provided for in the COSPAS-SARSAT 406 MHz Channel Assignment Plan, a revision of document C/S T.001 will be developed for adoption by the COSPAS-SARSAT Council, so as to avoid the need for successive amendments when new channels are opened for use. A subsequent revision of Recommendation ITU-R M.633 will be proposed to keep this recommendation aligned with the COSPAS-SARSAT specification.

### **Draft amendments to resolution A.810(19)**

6.10 In connection with the above, the Sub-Committee considered document COMSAR 5/6/2 (COSPAS-SARSAT) proposing to amend Part B (Satellite signals) of the annex to resolution

A.810(19) and agreed on draft amendments and prepared a draft MSC resolution on the adoption of the amendments to resolution A.810(19), given at annex 6, for submission to MSC 74. The Committee was invited to consider and adopt the draft MSC resolution.

6.11 France (COMSAR 5/6/3) informed the Sub-Committee of the results of the investigation conducted by its national Administration into the incident when a French fishing vessel sank off the Island of Marie-Galante (French Antilles) in February 1999. In particular, the reason for the delay by the COSPAS-SARSAT system in locating the beacon used by the crew, was examined. An examination of the position location revealed that the beacon had initially been detected for a brief interval and thereafter not at all while on board the liferaft. The question was thus raised as to whether there was any connection between the material used for the liferaft's construction and the malfunctioning of the beacon. The bottom of liferafts of this type are in fact reinforced with aluminium film to provide increased protection against moisture and the cold.

A test was accordingly carried out to ascertain whether the aluminium film impairs the radio signal when a beacon is activated inside the liferaft. Four similar EPIRBs were therefore activated over a 24-hour period, one on the top of a building, one in the water beside the liferaft, one inside on the bottom of the liferaft and one inside along the liferaft's vertical wall. The liferaft was kept at anchor in a bay throughout the test. As a result all the beacons, **except the EPIRB positioned on the bottom of the liferaft**, were correctly detected and located, several bursts having been received at the correct signal level (-112dBm).

The test highlights the importance of the way in which an EPIRB on board a liferaft is used. It confirms that the correct position for the beacon is:

- either on the inside, in an upright position, with the antenna unobstructed;
- or in the water, with a lanyard (see MSC/Circ.660) securing it to the liferaft.

6.12 The Sub-Committee noted the above information and that it had been recommended to the French Administration responsible for maritime safety to inform users and manufacturers of these findings and to take the appropriate measures.

6.13 The delegation of the United Kingdom shared the concern expressed above and pointed out that, in accordance with SOLAS regulation IV/6.2.2, a EPIRB should be so located as to ensure the greatest possibility degree of safety and operational availability. The United Kingdom, supported by some delegations, expressed a view that clear unambiguous instructions should be given to users on the use of a EPIRB in a liferaft.

6.14 In this context, the Sub-Committee recalled that:

- .1 by MSC/Circ.660 (12 January 1995), MSC 64 had drawn the attention of all concerned that the buoyant lanyard should only to be used by survivors for securing the EPIRB to a liferaft, lifeboat or person in the water; and
- .2 the International Life-Saving Appliance (LSA) Code requires that a survival craft shall be provided with means to mount a survival craft radar transponder (SART) at a height of at least 1 m above the sea.

6.15 Following discussions of the issue, the Sub-Committee invited France to provide further information on the trials. Member States were invited to consider the matter and provide their comments and proposals to COMSAR 6 for consideration.

## **7 EMERGENCY RADIOCOMMUNICATIONS: FALSE ALERTS AND INTERFERENCE**

### **General**

7.1 The Sub-Committee recalled that within the last few years it was concentrating on measures to reduce the number of false distress alerts. With this in mind, the Sub-Committee had revised almost all performance standards for GMDSS equipment and had prepared guidelines and recommendations for reducing false distress alerts, such as:

- .1 resolution A.814(19) - Guidelines for the avoidance of false distress alerts;
- .2 resolution A.887(21) - Establishment, updating and retrieval of the information contained in the registration databases for the GMDSS;
- .3 MSC/Circ.861 - Measures to reduce the number of false distress alerts;
- .4 MSC/Circ.862 - Clarifications of certain requirements in IMO performance standards for GMDSS equipment;
- .5 MSC/Circ.863 - Recommendation on prevention of harmful interference to 406 MHz EPIRBs operating with the COSPAS-SARSAT system;
- .6 COMSAR/Circ.2 - Procedures for responding to an MF (2187.5 kHz) DSC distress alert in sea areas A2;
- .7 COMSAR/Circ.12 - Relays of distress alerts by digital selective calling;
- .8 COMSAR/Circ.17 - Recommendation on use of GMDSS equipment for non-safety communications; and
- .9 COMSAR/Circ.21 - Procedure for responding to DSC distress alerts by ships.

7.2 The Sub-Committee also noted that:

- .1 as instructed by COMSAR 3 and endorsed by MSC 69, the Secretariat had brought MSC/Circ.863 to the attention of the Director of the ITU Radiocommunication Bureau and requested ITU-BR to develop emission standards such that emissions in the 406.0-406.1 MHz band are consistent with, and do not exceed, the requirements set out in Recommendation ITU-R.SM.1051;

- .2 MSC 70 had approved MSC/Circ.882 on Guidelines on annual testing of 406 MHz satellite EPIRBs and, noting that the Sub-Committee was of the opinion that similar guidelines should also be prepared for L-band satellite EPIRBs at its next session, instructed COMSAR 4 to consider this matter under its agenda item on "Emergency radiocommunications: false alerts and interference". COMSAR 4 was informed by CIRM that they were in the process of developing a proposal for guidelines and would submit their proposal to COMSAR 5; and
- .3 COMSAR 4 had considered COMSAR 4/7/3 (Japan) on the consideration of measures to reduce false distress alerts under the GMDSS. Japan proposed various forms for use by Member Governments on reporting results to IMO and requested to circulate these as a COMSAR circular. The Sub-Committee agreed in principle to the Japanese proposal that additional information was needed to better understand causes for false alerts, and invited Member Governments to collect sufficient data from false alerts and relays for analysis and submit their results to COMSAR 5.

7.3 The Sub-Committee considered documents COMSAR 5/7 and COMSAR 5/7/1 whereby COSPAS-SARSAT provided information on 406 MHz beacon false distress alerts and interference in the 406.0 – 406.1 MHz frequency band; COMSAR 5/7/2 (Norway) proposing a system monitoring and reporting programme for an overall evaluation of the GMDSS; COMSAR 5/7/3 (CIRM) suggesting a standardized system of shore-based maintenance for satellite EPIRBs and ancillary devices to maximize reliability and to minimize the incidents of false distress alerting; COMSAR 5/7 (Argentina) proposing to analyze the current situation with false distress alerts; COMSAR 5/7/5 (Japan) proposing to develop a COMSAR circular requesting Member States to provide information on false distress alerts to the Secretariat; COMSAR 5/INF.3 (Singapore) providing statistics on false distress alerts; COMSAR 5/INF.4 and COMSAR 5/INF.9 (Russian Federation) informing on test procedures for DSC systems and a professional refresher and updating training for GMDSS operators aimed to reduce a number of false distress alerts; and COMSAR 5/INF.14 (Norway) providing examples of various forms used by JRCC Stavanger for reporting on distress alerts.

#### **Terms of reference for the Working Group (WG 1)**

7.4 With a view to consider the above proposals and related information, the Sub-Committee instructed the Working Group, established under agenda item 3 (paragraph 3.15), to:

- .1 consider documents COMSAR 5/7, COMSAR 5/7/1, COMSAR 5/7/2, COMSAR 5/7/3, COMSAR 5/7/4 and COMSAR 5/7/5 taking into account the information provided in COMSAR 5/INF.3, COMSAR 5/INF.4, COMSAR 5/INF.9 and COMSAR 5/INF.14;
- .2 prepare a draft MSC circular - Guidelines for shore-based maintenance of satellite EPIRBs and ancillary devices; and
- .3 prepare a standardized questionnaire to be used by MRCCs on collecting relevant data from ships which have sent unintended distress alerts.

7.5 The observer from IMSO advised the Sub-Committee that Inmarsat Ltd. has finalized development of a Distress Alert Quality Control System which enables the company to identify those mobile earth stations that use the distress alert facility of Inmarsat equipment. Inmarsat has

already begun to take pro-active steps to reduce the number of false distress alerts over its system by contacting those ships responsible for making these transmissions. It is expected that this will lead to a significant and early reduction in the number of false distress alerts over the Inmarsat system.

### **Report of the Working Group**

7.6 Having received the report of the Working Group (COMSAR 5/WP.3), the Sub-Committee took action as indicated hereunder.

### **Prevention of false alerts and unnecessary relays in order to eliminate the unnecessary sounding of alarms on ship and coast radio stations**

7.7 The Sub-Committee invited Administrations to note the information contained in COMSAR 5/7 in development of a standard GMDSS format and questionnaire on false alerts to be developed for the Sub-Committee's next session.

7.8 The Sub-Committee also invited Administrations to note the information in Table 1 of the annex to COMSAR 5/7/1 identifying specific locations of interference sources with a view to ensuring that transmissions from these locations cease as soon as possible.

7.9 In considering COMSAR 5/7/2 (Norway) proposing a systematic Monitoring and Reporting Programme, the Sub-Committee agreed that such a programme should be conducted. The Sub-Committee also agreed that further discussion was necessary before a standardized format and the complete categories of information to collect could be agreed. Accordingly, the Sub-Committee endorsed the conclusion of the Working Group on the need for a correspondence group to develop a standardized format or formats and questionnaires and to develop a GMDSS system monitoring and reporting (SMR) programme for false distress alerts, and therefore decided to establish a correspondence group, under the co-ordination of Norway with the following terms of reference:

- .1 guidelines to Administrations;
- .2 procedure on how to collect data on false alerts;
- .3 how to report collected information to SMR;
- .4 examples on how SMR should derive "Lessons Learned"; and
- .5 procedures for how to report feedback.

7.10 The Sub-Committee further requested the group to submit its preliminary draft report for consideration by COMSAR 6.

7.11 Taking the above into account, the Sub-Committee invited the Committee to extend the target completion date of the agenda item "Emergency radiocommunications: False alerts and interference" to 2002.

7.12 The Sub-Committee invited Administrations to notify Mr. Bjorn Magnussen\* (Norway) by e-mail if interested in participating in the correspondence group, and also to take into account COMSAR 5/7/4 (Argentina), COMSAR 5/7/5 (Japan), COMSAR 5/INF.3 (Singapore) and COMSAR 5/INF.14 (Norway) when preparing suggestions as to what types of data were needed to be collected for each distress alert, how many specific different reports were needed, formats for reporting and how to analyse the results.

7.13 The Sub-Committee noted the opinion of the Japanese delegation that bearing in mind the importance of collecting information on false distress alerts to assess the accurate situation of reliability of maritime alert system, the relevant information should continue to be collected intersessionally without awaiting the completion of standardized format, and Member States should submit it to the next session of the Sub-Committee.

7.14 Argentina expressed its concern on the false alerts issue because of the increasing number of non-SOLAS ships joining the GMDSS system, but was of the opinion that training and technical solutions would reduce the false alerts rate.

### **Guidelines for shore based maintenance of satellite EPIRBs and Ancillary Devices**

7.15 The Sub-Committee noted a preliminary draft COMSAR circular on Guidelines for establishing shore-based maintenance of satellite EPIRBs, given at annex 5 to COMSAR 5/WP.3 and invited Member Governments to submit their comments and proposals on the matter to COMSAR 6 for further consideration.

### **Testing of Digital Selective Calling (DSC) Systems and Algorithmic Verification Tests of Narrow Band Direct-Printing (NBDP) Telegraph Equipment**

7.16 The Sub-Committee noted COMSAR 5/INF.4 (Russian Federation) concerning testing of digital selective calling systems and algorithmic verification testing of Narrow Band Direct Printing Telegraphic Equipment and invited Administrations to use the information contained in testing these systems.

### **Professional refresher and updating training of GMDSS operators and measures aimed at reduction of false alerts**

7.17 The Sub-Committee also noted COMSAR 5/INF.9 (Russian Federation) concerning refresher training for GMDSS operators and invited Administrations to take into account the actions indicated in paragraph 5 of this document regarding professional refresher training for GMDSS operators.

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## **8 MATTERS CONCERNING SEARCH AND RESCUE, INCLUDING THOSE RELATED TO THE 1979 SAR CONFERENCE AND THE INTRODUCTION OF THE GMDSS**

### **HARMONIZATION OF AERONAUTICAL AND MARITIME SEARCH AND RESCUE PROCEDURES, INCLUDING SAR TRAINING MATTERS**

#### **General**

8.1 The Sub-Committee was informed that MSC 72 had noted the Sub-Committee's view on the terms of reference and composition of the Joint IMO/ICAO Working Group (JWG) on Harmonization of Aeronautical and Maritime SAR Procedures, in particular that the Sub-Committee had agreed that the group's existing terms of reference adequately reflected its tasks and also that its continuation was justified by the amount of work still to be done.

8.2 The Sub-Committee recalled that with respect to the composition of the JWG, COMSAR 4 had noted that, according to the rules of ICAO, a study group of experts would usually consist of approximately 5 to 6 experts with high expertise/experience and no additional observers were invited to sessions of such groups. The number of eight members each from IMO and ICAO had already exceeded that usual practice and should not be increased. However, noting that observers from IMO Member Governments had been invited to previous sessions of the JWG and recognizing the danger of losing the required continuity in expertise and experience in case a rotating membership system was introduced, the Sub-Committee had agreed to keep the composition of the JWG as it was. Participation of maritime observers should, however, be encouraged and their active participation in, and comments and proposals to, sessions of the JWG should be facilitated. Co-ordination meetings before JWG sessions could also be held.

8.3 The Sub-Committee also noted that, having noted that the twenty-first session of the Assembly adopted resolution A.894(21) on the International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual in which it recommends Governments to ensure that all ships entitled to fly the flag of their countries carry on board a copy of Volume III of the IAMSAR Manual, MSC 72 had authorized COMSAR 5 to consider, under its agenda item on "Matters concerning search and rescue, including those related to the 1979 SAR Conference and the introduction of the GMDSS", the implications of, and, if necessary, prepare amendments to the SOLAS Convention for the purpose of, making the carriage of Volume III on board ships mandatory.

8.4 It was recalled that COMSAR 4, in considering a GMDSS Coast Station Operator's Course (CSOC) (appendix L, document COMSAR 4/8/4), had agreed that review of the course was needed before becoming a document for international use. It was intended to reconsider appendix L at COMSAR 5.

8.5 The Sub-Committee briefly considered documents COMSAR 5/8 and COMSAR 5/8/Add.1 (Secretariat) reporting on the outcome of the seventh meeting of the ICAO/IMO Joint Working Group; COMSAR 5/8/4 (France) suggesting a new item be included in the agenda for the next session of the JWG; COMSAR 5/8/13 (Russian Federation) proposing amendments to the draft GMDSS Coast Station Operator's Course (appendix L to COMSAR 4/8/4); and COMSAR 5/INF.13 (United Kingdom) advising on the United Kingdom's GMDSS Coast Station Operator's Certificate (CSOC) Course.

### **Establishment of a Working Group**

8.6 In order to consider the above proposals and comments in detail, the Sub-Committee established the SAR Working Group (WG 2) under the Chairmanship of Mr. U. Hallberg (Sweden), Vice-Chairman of the Sub-Committee, with the following terms of reference:

- .1 to consider documents COMSAR 5/8 and COMSAR 5/8/Add.1, COMSAR 5/8/4, COMSAR 5/8/13 and COMSAR 4/8/4, appendix L taking into account COMSAR 5/INF.13;
- .2 to prepare draft amendments to the SOLAS Convention for the purpose of making the carriage of Volume III of the IAMSAR Manual on board ships mandatory, if necessary; and
- .3 to prepare proposals on development of a GMDSS Coast Station Operator's Course (CSOC) and a draft course, if agreed.

### **Report of the Working Group**

8.7 Having received the first part of the report of the Working Group (COMSAR 5/WP.4), the Sub-Committee approved it in general and took action as indicated hereunder.

8.8 The Sub-Committee considered the report of the seventh session of the ICAO/IMO Joint Working Group on Harmonization of Aeronautical and Maritime Search and Rescue held in Norway from 2 to 7 April 2000 (COMSAR 5/8 and Add.1) and, in particular, the recommendations given therein.

8.9 The Sub-Committee agreed on recommendation 7/2 – Review of a list of background references, namely; that the list of background information in Appendix E should be reviewed at each meeting of the Joint Working Group and additional references should be included if decided.

8.10 With regard to recommendation 7/3 - Medical intervention teams, the Sub-Committee agreed that the questionnaire relating to medical intervention teams, as attached in Appendix F, should be completed by the appropriate qualified persons and be returned to France by January 2001 at the latest, extending the previous deadline by one month.

8.11 The Sub-Committee also agreed on:

- .1 recommendation 7/4 - Mass rescue operations, namely that, provisions giving advice on mass rescue operations be developed by the JWG/8; and
- .2 recommendation 7/5 - Safety of large passenger ships, namely that, an integrated system approach be developed to address the capability of SAR services to take care of a large number of persons in distress, taking into account the development of larger passenger ships and inappropriately designed existing ships, for the evacuation of a large number of persons,

recalling that the MSC 73 Working Group on Large passenger ships was developing a work plan for the Organization on this issue, including these particular SAR matters, and invited the

Committee to inform its Working Group of the ongoing work of the Joint ICAO/IMO Working Group on this particular matter.

8.12 The Sub-Committee further agreed on recommendation 7/6 – Development of web sites, namely that, RCCs should develop web sites in order to disseminate information related to search and rescue such as delimitation of search and rescue regions, SAR units capabilities, IMO circulars and Table SAR 1 of the ICAO air navigation plans.

8.13 Having been informed by the Secretariat on the development, by the Organization, of a new web site, the Sub-Committee agreed that key documents/circulars, based on the list set out in SAR.7/Corr.2, should be included into the new IMO web site to enhance availability of information and instructed the Secretariat to keep the information updated between sessions of the Sub-Committee.

### **Mandatory carriage requirements for Volume III of the IAMSAR Manual**

8.14 The Sub-Committee, recalling operative paragraph 7 of resolution A.894(21) recommending “that Governments are invited to ensure that ships entitled to fly the flag of their countries carry on board a copy of Volume III of IAMSAR Manual”, unanimously agreed that there was a need for Volume III to be carried on board all ships to which chapter V applies and that Governments should limit their exemptions from this requirement.

8.15 The Committee was invited to approve, to this effect, the proposed draft amendments to SOLAS regulation V/21 as set out at annex 7 with a view for adoption at MSC 75.

8.16 The delegation of Cyprus pointed out that there should be a sufficient implementation period available between the entry into force of the amendments and the compliance date, e.g. after the next annual survey.

8.17 The Sub-Committee recommended that Volume III of the IAMSAR Manual should be widely available and requested the Secretariat to consider a lower price than at present.

### **Guidance for MRCCs involved in aviation SAR**

8.18 The Sub-Committee, recalling that the IAMSAR Volume II, Appendices C to G contain some guidance on the issue, considered and agreed on the proposal by France (COMSAR 5/8/4) to invite the ICAO/IMO Joint Working Group to review, at its next session, the need for further guidance for MRCCs which may be involved in aviation search and rescue operations.

### **CSOC training course**

8.19 The Sub-Committee considered documents COMSAR 5/8/13 (Russian Federation) and COMSAR 5/INF.13 (United Kingdom) on GMDSS Coast Station Operator’s Course (CSOC) and recalled that COMSAR 4/8/4, Appendix L contained the outline for such a course.

8.20 Having considered the matter in depth and noting that a modular approach may be needed and bearing in mind that operators may or may not have a GOC certificate, the Sub-Committee agreed that the course outlined in COMSAR 4/8/4, Appendix L should be appropriately modularised and invited the ICAO/IMO Joint Working Group to finalize the structure of the CSOC training course at its next session for consideration by COMSAR 6 and submission to MSC 75 for approval as a basis for an IMO model course.

## **REVISION OF THE IAMSAR MANUAL**

### **General**

8.21 The Sub-Committee recalled that COMSAR 4 had invited the Joint ICAO/IMO Working Group to consider the appropriate amendments to the Manual at its seventh session for subsequent consideration by COMSAR 5.

8.22 The Sub-Committee noted that MSC 72 had requested the Sub-Committee in context of resolution A.894(21) – *International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual*, to ensure that, prior to adoption by the MSC, any proposed amendments to the IAMSAR Manual are agreed with ICAO.

### **Additional terms of reference for the Working Group (WG 2)**

8.23 The Sub-Committee further instructed the Working Group established under agenda item 8 to:

- .1 consider paragraph 3.9 of document COMSAR 5/8 and Appendix D to COMSAR 5/8/Add.1; and
- .2 prepare a draft MSC circular on adoption of amendments to the IAMSAR Manual, follow the amendments procedure given in annex 2 to resolution A.894(21).

### **Report of the Working Group**

8.24 Having received the first part of the report of the Working Group (COMSAR 5/WP.4) and approved it in general (see paragraph 8.7), the Sub-Committee considered and agreed the draft MSC circular on the adoption of the amendments to the IAMSAR Manual and the incorporated amendments (COMSAR 5/8/Add.1, Appendix D), given at annex 8 for submission to ICAO and MSC 74 for adoption. The Committee was invited to adopt the draft MSC circular.

## **PLAN FOR THE PROVISION OF MARITIME SAR SERVICES, INCLUDING PROCEDURES FOR ROUTEING DISTRESS INFORMATION IN THE GMDSS**

### **General**

8.25 The Sub-Committee noted that MSC 72 had approved circulars prepared by COMSAR 4, as follows:

- .1 COMSAR/Circ.22 – Guidance on data fields for SAR databases;
- .2 COMSAR/Circ.23 – Guidance on Central Alerting Posts (CAPs);
- .3 MSC/Circ.959 – Interim procedures for an MRCC on receipt of distress alerts; and
- .4 MSC/Circ.960 – Medical assistance at sea.

MSC 72 had also approved COMSAR/Circ.967 - Piracy and armed robbery against ships; Directives for Maritime Rescue Co-ordination Centre (MRCCs).

### **Outcome of the 1998 Fremantle SAR/GMDSS Conference – Proposed establishment of an International SAR Fund**

8.26 The Sub-Committee also noted that MSC 72 had recalled that MSC 71, being informed that the full report of the Indian Ocean Conference on Maritime SAR and the GMDSS, held in Fremantle, Australia, in September 1998, had been submitted to COMSAR 4 for consideration, had noted Conference resolution No.5 (Establishment of an International SAR Fund) inviting the Organization, in co-operation with the aviation and maritime communities and for the purpose of assisting countries, in particular developing countries, to fulfil their obligations under the SAR and SOLAS Conventions, to consider establishing an International SAR Fund. MSC 72 considered the analysis of the technical aspects of the proposal by COMSAR 4 and endorsed the Sub-Committee's identification of East and West Africa and parts of Asia and the Pacific, Central and South America and the Mediterranean regions as being the areas mainly lacking SAR and GMDSS facilities and agreed that, in considering any remedial action needed to be taken, priority should be given to the African regions.

The Committee also endorsed, with respect to the technical aspects of the aforementioned resolution of the Fremantle Conference, the suggested 5-step approach (paragraph 8.28 of COMSAR 4/14) and agreed to carry out a study/assessment/analysis of the matter before any further action is taken thereon.

### **Regional Conference on Maritime Search and Rescue and the GMDSS (Florence, Italy, 16 to 20 October 2000)**

8.27 The Sub-Committee recalled that COMSAR 4 was informed that, the Italian Government had offered to host a SAR/GMDSS Conference as a follow-up to the Fremantle Conference. MSC 72 instructed the Secretariat to report the outcome of the Conference to COMSAR 5 for consideration and appropriate action, including advising MSC 74 as to what, if any, action should be taken next. MSC 73 noted an oral report by the Secretariat on the Florence Conference, recalling that COMSAR 5 would consider the outcome of the Conference (document COMSAR 5/8/3) and report to MSC 74.

8.28 The Sub-Committee, recalling the complete history of IMO's activities on the provision of global SAR services from the adoption of the 1979 SAR Convention through to the various SAR/GMDSS seminars, workshops and Conferences in the different regions of the world, as far as conferences are concerned, collated in document COMSAR 5/INF.2, was informed that the Regional Conference on Maritime Search and Rescue (SAR) and the Global Maritime Distress and Safety System (GMDSS) had been convened, as scheduled, in Florence, Italy, from 16 to 20 October 2000 in co-operation with the Government of Italy and the Region of Tuscany; and with financial support provided by the Governments of Italy, the Netherlands, Norway and the United Kingdom and the European Commission and the International Transport Workers' Federation (ITF).

Thirty countries had been invited and twenty-six participated. More than 80 participants, including lecturers and observers, had attended the Conference. The Conference aimed at bringing together representatives of all the Western, Southern and Eastern African and adjacent Island States to discuss SAR and GMDSS issues. Following the successful completion of the Global SAR Plan by the 1998 Fremantle SAR/GMDSS Conference, the Florence Conference aimed, in particular, at initiating steps towards practical implementation of the plan effectively

and economically in the African countries bordering the Atlantic and Indian Oceans, which COMSAR 4 had identified and MSC 72 had endorsed as the areas mainly lacking SAR/GMDSS facilities, along with parts of Asia and the Pacific, Central and South America and the Mediterranean regions.

8.29 In this regard the Sub-Committee noted that the Florence Conference had adopted, *inter alia*, resolutions on:

- .1 Arrangements for the provision and regional co-operation and co-ordination of maritime search and rescue (SAR) services and co-operation between States (Resolution No. 1), proposing, among others, the establishment of five sub-regional maritime rescue co-ordination centres in the western, southern and eastern parts of Africa;
- .2 Establishment of an International SAR Fund (Resolution No. 2);
- .3 Technical co-operation in maritime search and rescue (SAR) and the Global Maritime Distress and Safety System (GMDSS) (Resolution No. 3);
- .4 Implementation of the Global Maritime Distress and Safety System (GMDSS) in the African Sea areas of the Atlantic and Indian Oceans (Resolution No. 4); and
- .5 Application of tacit acceptance procedures for the completion of the Global Search and Rescue Plan (Resolution No. 5).

8.30 The Sub-Committee recalled that COMAR 4 against the outcome of the 1998 Fremantle Conference (COMSAR 4/8/9) had agreed on a 5-step approach namely:

- .1 Does the Sub-Committee share the view that there is a need for IMO to take action to address the problem of inadequate SAR/GMDSS facilities in various parts of the world;
- .2 If the answer to this is to the affirmative, then action should be taken to identify the areas so lacking of SAR/GMDSS facilities;
- .3 The next step would be that a study be carried out to advise countries in the regions concerned and IMO on what action should be taken at the regional level in a manner which, by pooling facilities and acting in a well co-ordinated fashion, efficiency in the delivery of SAR/GMDSS services is maximised and the corresponding cost minimized;
- .4 In the light of such a study successfully conducted, that the cost of putting in place the necessary facilities and training the requisite personnel is assessed; and finally
- .5 On the basis of such an assessment, take action to satisfy the financial needs of the scheme.

8.31 The Sub-Committee further recalled that COMSAR 4, agreeing to step 1, subsequently identified the areas mentioned in paragraph 8.26 as being the areas mainly lacking SAR/GMDSS facilities and furthermore agreed that priority should be given to the African regions first and to the other regions later in accordance with the outcome of the assessments.

8.32 The Sub-Committee briefly considered the implications of resolution No. 2 on the establishment of an International SAR Fund.

8.33 The Sub-Committee noted the information provided by the Secretariat that before consideration could be given as to how such an International SAR Fund could be established and operated, it was anticipated that fact-finding missions were to be conducted in the regions of the five sub-regional RCCs, proposed to be established by resolution No. 1 to advise on the real needs in terms of, e.g., personnel, equipment, training, and finance, etc., for these sub-regional RCCs to discharge their responsibilities under the SAR Convention. That advice would be collectively submitted to COMSAR 6 for consideration and recommendations to MSC 75 for approval and TC 51 for appropriate action. On that basis and at that time the Committee would be in a position to make an informed decision on the funding aspect in co-operation with the TC Committee.

8.34 After discussion the Sub-Committee instructed the SAR Working Group to consider the five resolutions from the Florence Conference and make recommendation thereon including the next step to be taken on the five-step approach.

8.35 The Spanish delegation informed the Sub-Committee that Spain had attended the Florence Conference and with regard to annex 1 to resolution No. 1 of the Conference, on the establishment of a sub-regional rescue co-ordination centre in Morocco for SAR operations in [Canary Island (Spain)], Mauritania, Senegal, Gambia, Cape Verde and Guinea-Bissau, that delegation proposed to maintain the position of the Canary Islands between square brackets, pending the report to the Secretary-General of IMO on the decision of this matter, that would be forwarded shortly, before MSC 74.

The rescue centers that Spain has in the Canary Islands collaborate currently with all the bordering countries in search and rescue operations in that area and that collaboration would be continued as effectively as always. Following the aims contained in the resolution No. 1, the bilateral agreements of collaboration with the African countries which border the Spanish SAR regions, will be a final solution to regulate that collaboration. With regard to resolution No. 2, that delegation was of the opinion that where it said "radiocommunication services, are inadequate along the African coastline" it should specify "along all the African coastline".

#### **Presentation of Spanish Administration's national plan for special services for saving human life at sea and controlling pollution**

8.36 The Director General of the Spanish Merchant Marine had the honour and pleasure to address all delegations attending COMSAR 5 to draw their attention to the Spanish Maritime Administration's successful efforts in establishing a public service for search and rescue and pollution control, which has raised the level of response to maritime emergencies along the Spanish coasts, thus saving human lives and protecting the coastline and the marine environment.

Given the length of the Spanish coastline (8,000 km), the country's area of SAR responsibility (1.5 million square kilometres) and the intensive maritime traffic concentration in the traffic separation schemes of the Strait of Gibraltar and Finisterre, with a global traffic of some 140,000 ships/year, it was considered necessary to set up a network to supervise the traffic and co-ordinate maritime search and rescue operations. This network consists of a national centre and further 20 centres located all along the coast, as well as maritime, air and pollution control facilities.

Forming part of the State Corporation for the Saving of Life at Sea, the Jovellanos Centre for Integral Maritime Safety, located in the north of Spain (Gijon), provides training for professional safety personnel. It has five simulators and a staff of 40 devoted to training. Since 1993 more than 25,000 students have been trained there.

Lastly, the Director General welcomed the fact that the Secretary-General, Mr. O'Neil, was present. His attendance at the presentation of the Jovellanos Centre lent moral support to the Spanish Administration's undertaking and encouraged continuity in the training work that helps to improve maritime safety.

### **Clarification of SOLAS regulation V/15(c)**

8.37 The Sub-Committee noted that MSC 72 had considered document MSC 72/9/2 (United Kingdom) addressing the issue and, after considerable discussion, agreed, in principle, that regulation V/15(c) should apply to all passenger ships to which SOLAS Chapter I applies operating through various SAR regions and, to this effect, it should be appropriately amended.

Having, in principle, agreed as above, the Committee also agreed that the best way to do so would be at MSC 73 when the revised SOLAS Chapter V would be considered for adoption. Accordingly, it invited the United Kingdom and any other interested parties to submit proposals clarifying the issue and providing appropriate amendments to the draft regulation. The delegation of the United Kingdom agreed to do so.

Having agreed on the proposed application of the regulation, MSC 72 instructed COMSAR 5, taking into account document MSC 72/9/2, to consider a practical system for the preparation of SAR co-operation plans for passenger ships which routinely pass through multiple SAR regions.

8.38 The Sub-Committee further noted that MSC 73 had adopted the revised SOLAS Chapter V and regulation V/15(c) had become regulation V/7.3, as amended.

8.39 The Sub-Committee considered documents COMSAR 5/8/9, COMSAR 5/8/10, MSC 72/9/2 (United Kingdom), COMSAR 5/8/11 (ICCL), COMSAR 5/8/14 (United States) and COMSAR 5/2/2, paragraph 4 and the annex (Secretariat) concerning the development of a practical system for the preparation of SAR co-operation plans for passenger ships as required by SOLAS regulation V/7, as amended.

8.40 In order to consider the above proposals and comments in detail, the Sub-Committee instructed the SAR Working Group to:

- .1 consider documents COMSAR 5/2/2, paragraph 4 and the annex, COMSAR 5/8/9, COMSAR 5/8/10, COMSAR 5/8/11 and COMSAR 5/8/14; and
- .2 review MSC/Circ.864 on Guidelines for preparing plans for co-operation between SAR services and passenger ships, in accordance with the revised SOLAS Chapter V, regulation 7, revoking MSC/Circ.864.

### **Revision of SAR.7/Circ.1 (1998)**

8.41 The Sub-Committee, noting that MSC 72 endorsed the Sub-Committee's action in instructing the Secretariat to issue SAR.7/Circ.2 (2000) containing a list of IMO documents and

publications which should be available at Maritime Rescue Co-ordination Centres, thus revoking SAR.7/Circ.1(1998), referred a proposal by France (COMSAR 5/8/6) on updating of these circulars to the SAR Working Group for consideration in detail.

### **Implementation of the Provisional Global SAR Plan**

8.42 The Sub-Committee also noted that MSC 72, having considered the invitation by COMSAR 4, subject to the Committee's agreement, to implement the tacit acceptance procedure, as discussed at COMSAR 4 (COMSAR 4/14, paragraphs 8.50 to 8.55), and, taking into account the opinion expressed by several delegations, did not agree that an optional tacit acceptance procedure, similar to that used by ICAO, should be recommended for use by SAR Convention Parties to facilitate completion of the global SAR plan where necessary; and instructed COMSAR 5 to consider the matter further and submit proposals to MSC 74 for consideration and action as appropriate.

Being informed that to that day, only 14 SAR.6 circulars had been issued on notification of agreements in accordance with paragraph 2.1.4 of Chapter 2 of the Annex to the SAR Convention, MSC 72 reiterated its invitation to SAR Convention Parties to notify the Secretary-General of agreements they have concluded on the establishment of search and rescue regions in accordance with the above provision.

8.43 The Sub-Committee considered in this context resolution No. 5 on application of tacit acceptance procedures for the completion of the Global SAR Plan adopted by the Florence Conference (COMSAR 5/8/3, annex 5) and, recalling the Committee's decision on the equivalent COMSAR 4 proposal (see paragraph 8.42 above), agreed to instruct the SAR Working Group to consider the matter further.

### **Other SAR matters**

8.44 The Sub-Committee briefly considered documents COMSAR 5/8/1, whereby ISAF, as invited by COMSAR 4, had provided information on its activity in organizing long distance yacht racing; COMSAR 5/8/2 (ICS) providing consideration on medical assistance at sea and endorsing the opinion expressed by the Netherlands at COMSAR 4 (paragraph 8.78 of COMSAR 4/14) (see also paragraphs 8.45 and 8.46 below); COMSAR 5/8/3 (Secretariat) reporting on the outcome of the Florence Conference; COMSAR 5/8/5 (France) suggesting a model agreement on SAR between a State responsible for a search and rescue region (SRR) and another State whose coasts are situated in its SRR; COMSAR 5/8/6 (France) proposing principles for the preparation and distribution of SAR.7/Circulars; COMSAR 5/8/7 (France) suggesting to invite the JWG to consider at its next session criteria and definitions of SAR statistics; COMSAR 5/8/8 (Chile) providing considerations on SAR services with respect to adventure navigation; COMSAR 5/8/9, COMSAR 5/8/10, MSC 72/9/2 (United Kingdom), COMSAR 5/8/11 (ICCL), COMSAR 5/8/14 (United States) and COMSAR 5/2/2, paragraph 4 and the annex (Secretariat) concerning the development of a practical system for the preparation of SAR co-operation plans for passenger ships, as required by SOLAS regulation V/7, as amended; COMSAR 5/8/12 (France and the United Kingdom) concerning updating or replacement of SAR.2/Circulars; and COMSAR 5/INF.2 (Secretariat) containing reports on maritime SAR and the GMDSS Conferences (1981 to 1998).

### **Additional medical equipment**

8.45 The Sub-Committee considered a document by ICS (COMSAR 5/8/2), responding to a proposal by Germany, France and Sweden (MSC 70/7/2) concerning medical assistance at sea. It

had been recommended that certain ro-ro passenger ships that did not have a doctor in the crew should carry a sealed medical first aid kit for utilization by a medical doctor. ICS endorsed the view expressed by the Netherlands at COMSAR 4 that there was no additional need for the proposed sealed medical first aid kit, as the existing arrangements had proven to be adequate. The addition to the medical supplies and equipment as suggested might lead to mistakes and false impressions of safety.

8.46 The delegation of Germany stated that a meeting of medical experts from Germany, France and Sweden had concluded that the medical kit was needed for life saving or potential life saving activities and was the most simple and economic solution to a medical emergency to utilize a medical doctor from among passengers. The Hippocratic oath demanded medical doctors to perform first aid at any time and place to the best of their abilities. First aid given by doctors in medical emergencies were largely standardized globally and the basic materials needed for that purpose well known and used similarly, world-wide. Rapid response was of the utmost importance in these emergencies and could not be matched by current SAR services.

### **Expression of appreciation**

8.47 The Sub-Committee noting information provided by the ISAF observer on the recent successful search and rescue operation in the North Atlantic by the German container ship “Hoechst Express”, co-ordinated by MRCC Falmouth, saving the crew of the long distance race yacht “Team Phillips”, expressed appreciation to the master and crew of the container ship and the MRCC for the excellent humanitarian work.

### **Additional terms of reference for the Working Group (WG 2)**

8.48 In order to consider the above proposals and comments in detail, the Sub-Committee instructed the Working Group established under agenda item 8 (paragraph 8.6) to:

- .1 consider documents COMSAR 5/8/1, COMSAR 5/8/2, COMSAR 5/8/3, COMSAR 5/8/5, COMSAR 5/8/6, COMSAR 5/8/7, COMSAR 5/8/8, COMSAR 5/8/9, COMSAR 5/8/10, COMSAR 5/8/11, COMSAR 5/8/12 and COMSAR 5/8/14 taking into account COMSAR 5/INF.2;
- .2 revise MSC/Circ.864 on Guidelines for preparing plans for co-operation between SAR services and passenger ships, in accordance with the revised SOLAS Chapter V, regulation 7, revoking MSC/Circ.864;
- .3 prepare a draft MSC circular on a Model agreement on SAR between a State responsible for a SRR and another State whose coasts are situated in that SRR;
- .4 review COMSAR/Circ.22 and amend, if necessary;
- .5 develop principals on preparation and distribution of SAR.7/Circulars; and
- .6 review the format contained in document COMSAR 3/WP.3/Add.1, annex 3, regarding updating or replacement of SAR.2/Circulars.

## **Report of the Working Group**

8.49 Having received the second part of the report of the Working Group (COMSAR 5/WP.4/Add.1 and Corr.1 and WP.4/Add.2), the Sub-Committee approved it in general, except paragraphs 39 and 49.8 thereof, and took action as indicated hereunder.

## **List of IMO documents and publications which should be held by MRCCs**

8.50 The Sub-Committee considered a proposal by France (COMSAR 5/8/6) on the principles for the preparation and dissemination of SAR.7/Circulars and agreed that they should be included on the new IMO web site for provisional updating by the Secretariat and be circulated as a hard copy circular after each session of the Sub-Committee, at which it would be approved, as amended.

## **Search and rescue statistics**

8.51 Having considered a proposal by France (COMSAR 5/8/7) on harmonized criteria for search and rescue data and recalling the approval of COMSAR/Circ.22 by COMSAR 4 on Guidance on data fields for SAR databases and that Volume I of the IAMSAR Manual contained guidance thereon, the Sub-Committee agreed to invite the ICAO/IMO Joint Working Group to review the matter and report to COMSAR 6.

## **Updating of SAR.2 and SAR.3 circulars**

8.52 The Sub-Committee considered a joint proposal by France and the United Kingdom (COMSAR 5/8/12) on the updating of information contained in SAR.2/Circ.5 and recalled that it had developed, at COMSAR 3, a new format for the provision and dissemination of information as set out in COMSAR 3/WP.3/Add.1, annex 3, for consideration at a future session.

8.53 Having agreed, in principle, to follow the layout in the latter document and to combine both SAR.2 and SAR.3 circulars information in one format, the Sub-Committee agreed to:

- .1 the format (providing also information on whether the data provided was provisional or agreed), as amended;
- .2 instruct the Secretariat to include the new format in the new IMO web site as a document and disseminate it as COMSAR/Circ.27 inviting the provision of updates;
- .3 invite Member Governments to provide the information electronically, as far as possible, to expedite the compilation of the information; and
- .4 further instruct the Secretariat to compile the information received and update the data continuously and to make the data on the open web site, available for everybody who needs the information, be provided.

8.54 In the ensuing discussion on the provision of a Global SAR Plan, in accordance with the provisions of the SAR Convention, it was agreed that as "Global SAR Plan" should be construed the compilation of information provided by Governments, in accordance with paragraphs 2.1.4 and 2.1.11 of the Annex to the SAR Convention. Until this is achieved, the Plan will continue to be considered as "Provisional" and as an instrument providing information on the current availability of SAR services, thus assisting in the completion of the Global SAR Plan. The

Sub-Committee was of the opinion that the Organization should, as soon as practicable, produce a single document that could be recognized as the Global SAR Plan.

8.55 The Sub-Committee reiterated that only information submitted by Governments in accordance with paragraphs 2.1.4 and 2.1.11 of the Annex to the SAR Convention should appear in the new reporting format/database and not the information provided by participants in SAR seminars, workshops and conferences, organized by the Organization, as that was not official information in the sense of that referred to in the paragraphs mentioned above. The provision of provisional data should be encouraged though, but should be distinguished by the letter "P" in box 14. The Sub-Committee instructed the Secretariat accordingly.

8.56 The Committee was invited to endorse the action taken by the Sub-Committee in combining SAR.2 and SAR.3 circulars data in one new information format issued as COMSAR/Circ.27 and its inclusion into the new IMO website.

#### **Draft revised MSC/Circ.864**

8.57 The Sub-Committee considered documents COMSAR 5/8/9 and COMSAR 5/8/10 (United Kingdom), COMSAR 5/8/11 (ICCL) and the guidance given on this issue by MSC 73 as reflected in COMSAR 5/2/2, paragraph 4 and the annex.

8.58 Having considered the SAR Data Provider (SDP) concept, namely to hold the SAR co-operation plan information on behalf of the ship/operator and the MRCCs and to provide the data in a two-way system to both parties on request, the Sub-Committee agreed in principle to follow this concept as a basis for the revision of the Guidelines for preparing plans for co-operation between SAR services and passenger ships. It was stressed that the SDP needed to be available on a 24 hours basis to enable parties to download the required information at any time.

8.59 The Sub-Committee, recalling that MSC 72 instructed it to consider a practical system for the preparation and exercise of SAR co-operation plans for passenger ships which routinely pass through multiple SAR regions; and the guidance given by MSC 73, not to change the guidance in MSC/Circ.864 relevant to passenger ships other than those mentioned in the instruction given by MSC 72, namely those which routinely pass on fixed routes through one or multiple SAR regions, stressed that in drafting the Guidelines, it was important not to lose sight of this intention.

8.60 The Sub-Committee agreed that there was a general need for the passenger ship to report to the SAR region's RCC on its entry and stay in the region, as it was vital for the SAR services to know how many passenger ships with how many passengers were passing through the region at any one time. This was important for SAR planning purposes for the passenger ships themselves, but also for other ships passing through the region. The "reporting" could be done initially, e.g. on an annual basis with a brief report to the MRCC on arrival and would enable the MRCC to download the data from the SDP, if required, at that time.

8.61 It was stressed in this context that the SDP should not be considered a replacement for the contact to the relevant MRCCs but as a back-up system. Whichever system the ships concerned were using, they should be encouraged to keep close contact with the relevant MRCC.

8.62 In order to identify the SDP for a particular passenger ship it was necessary to maintain an index, accessible to all parties. The United Kingdom offered to set up and maintain such an index, and will provide information on it to MSC 74.

8.63 With regard to exercises of the SAR co-operation arrangements, the Sub-Committee agreed that these should preferably, whenever possible, be held in conjunction with other exercises.

8.64 It was stressed that SAR services were not to be limited to the evacuation of passengers but entailed other activities like fire fighting, etc., to keep the ship afloat and to use it for a successful SAR operation itself.

8.65 The Sub-Committee agreed that it needed further guidance by the MSC Working Group on Large passenger ships with regard to the need for reporting to the SAR region's RCC on arrival and stay in the region and invited the Committee to instruct its Working Group accordingly.

8.66 The Committee was also invited to note the Sub-Committee's discussion on the revision of the Guidelines and to approve the revised text of MSC/Circ.864 as agreed and set out in annex 9.

#### **Medical equipment on board ro-ro passenger ships without a doctor**

8.67 The Sub-Committee recalled its earlier consideration of a proposal by ICS (COMSAR 5/8/2), responding to a proposal by Germany, France and Sweden (MSC 70/7/2) concerning medical assistance at sea (see paragraphs 8.45 and 8.46).

8.68 The Sub-Committee, recalling the activities already completed by the Organization with regard to medical care on board ships in close co-operation with ILO and WHO, namely: the Document for Guidance; the relevant provisions of the revised STCW Convention and the STCW Code; the ILO Convention on Seafarers Health and Medical Care; and the IMO/ILO/WHO Medical Guide for ships and, noting that the latter was currently under revision, considered the matter in some detail and agreed in principle to the need for the provision of a medical first aid kit on ro-ro passenger ships that are not required to have a medical doctor permanently on board.

8.69 Having agreed that the requirement for such a "medical kit" should not be related to the compliance with the provisions of the ISM Code, the Sub-Committee agreed that this issue was an urgent matter, since SAR services include medical assistance and care as from 1 January 2001, and invited the Committee to include a new sub-item on "Development of a list of contents for a medical first aid kit for certain ro-ro passenger ships for utilization by a medical doctor" under the existing item "Matters concerning search and rescue, including those related to the 1979 SAR Conference and introduction of the GMDSS" with a high priority and one session to complete.

8.70 The Sub-Committee instructed the Secretariat to consult with ILO and WHO to establish their interest to the matter and inform MSC 74 accordingly.

8.71 In order to expedite the work on this issue the Sub-Committee agreed to establish a correspondence group of interested parties, including medical doctors, subject to MSC 74 assigning a high priority status to the sub-item referred to before, under the co-ordination of

France<sup>\*</sup>, to prepare the technical annex to a possible MSC circular, with the following terms of reference:

- .1 using document MSC 70/7/2, to develop a list of contents for a medical first aid kit for certain ro-ro passenger ships for utilization by a medical doctor;
- .2 to indicate any medical considerations to be taken into account when utilizing such a medical first aid kit; and
- .3 to review the relevant IMO/ILO/WHO instruments to avoid duplication of work with respect to .1 and .2 above.

### **Adventure navigation**

8.72 The Sub-Committee, considering the proposal by Chile (COMSAR 5/8/8) on the high risk to human life of adventure navigation and its impact on search and rescue services, recognized that the document addressed quite a number of different issues which needed to be considered by different Sub-Committees.

8.73 The delegation of Chile stated that, in parallel with this meeting, ROCRAM was holding its annual meeting in Venezuela, at which Chile had raised the issue of adventure navigation. In accordance with the results of this meeting, Chile would again raise this issue in the relevant committees and sub-committees with the aim of arriving at an IMO definition of the characteristics and conditions in which craft propelled by human beings may make ocean crossings and to find a common criterion for coastal States to authorize the sailing of such craft, which involve great demand for the use of SAR services. As far as the sketch annexed to document COMSAR 5/8/8 is concerned, this merely illustrates the internal limits of the maritime districts of Chile's national SAR organization, and thus does not claim to establish jurisdiction of any other kind.

8.74 Recalling the Secretary-General's opening remarks on the objective of the SAR Convention, namely to rescue people from the perils of the sea – a humanitarian task, which should always be discharged promptly irrespective of any political or financial implications, the size and type of the ships involved or the sea area and the nationality of persons in distress, the Sub-Committee reiterated that the philosophy of search and rescue services was that they be provided at no cost to the persons rescued.

8.75 In this context, the Sub-Committee noted with appreciation the substantial work already undertaken by ISAF, as outlined in document COMSAR 5/8/1, to ensure safety in long distance yacht racing. The co-operation with the yachting community, through ISAF, being probably the largest user of SAR services world-wide, was appreciated.

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## **FLORENCE CONFERENCE**

### **Regional RCCs**

8.76 The Sub-Committee, in considering the outcome of the Florence Conference (COMSAR 5/8/3) and, in particular, the 5 substantive resolutions given in corresponding annexes to that document, endorsed and supported resolution No. 1 on the Establishment of 5 sub-regional RCCs to cover the African coast from Morocco anti-clock wise to Somalia, noting that the coastal States concerned would retain coastal SAR services.

8.77 The Sub-Committee, embracing this regional approach, recommended that the Secretary-General reflects this in his anticipated communication to the Governmental focal points concerned, when informing them of the results of the Conference and inviting their consent to this resolution.

8.78 The Sub-Committee was also of the opinion that once this approach had proven to be successful, it should discuss in future, whether it could be used as a model for other regions in the world facing similar problems, as identified by COMSAR 4 (COMSAR 4/14, paragraph 8.32).

8.79 It was agreed that no further action could be undertaken with regard to the next, 3rd step in the 5-step approach, accepted at COMSAR 4, until the relevant Governments had responded positively to this resolution.

8.80 In considering the way forward, the Sub-Committee agreed that this had to be addressed one step at a time, namely to send co-ordinated fact finding missions to the 5 regions for the purpose of developing an inventory on what is needed in terms of equipment, communications training and finance for the sub-regional RCC. Only on the basis of the evaluation of the results of these missions and the anticipated costs involved, consideration could be given to the funding aspect.

### **International SAR Fund**

8.81 The Sub-Committee, briefly considering resolution No. 2 on the Establishment of an International SAR Fund, supported the idea in principle but agreed that it was premature to address this matter until step 3 above had been completed and the result thereof will be available.

8.82 The view was expressed that, if such a fund was to be established, it should be supplementary to the existing TC Fund of the Organization and the work to be undertaken would be preferably best served if it was implemented within the Organization's ITCP.

### **GMDSS**

8.83 In supporting in general resolution No. 4 of the Conference, the Sub-Committee agreed that with regard to the consideration of establishment of A2 areas around the African coast, the countries concerned should carefully study the need for any new communication facilities in detail before deciding on their establishment.

### **Global SAR Plan**

8.84 In considering resolution No. 5 on tacit acceptance procedure for completion of the global SAR plan, the Sub-Committee recalled that MSC 72 did not agree that an optional tacit acceptance procedure, similar to that used by ICAO, should be recommended for use by

SAR Convention Parties to facilitate completion of the global SAR plan where necessary; and had instructed COMSAR 5 to consider the matter further and submit proposals to MSC 74 for consideration and action as appropriate.

8.85 The Sub-Committee, noting that this was a regional approach of the African countries concerned, favoured such a procedure in principle, as it aimed at finalizing the global SAR plan expeditiously. Legal advice was, however, needed as to whether such a procedure would be admissible under the provisions of the SAR Convention, as amended. The Sub-Committee instructed the Secretariat to obtain such legal advice from the Legal Division and forward it to MSC 74 for consideration.

8.86 The Sub-Committee took no action with respect to paragraph 49.8 of document COMSAR 5/WP.4/Add.2.

### **Long distance yacht racing**

8.87 The Sub-Committee considered document COMSAR 5/8/1 by ISAF in some detail and, recalling its appreciation reported in paragraph 8.75 above, agreed that the relevant regulations were an excellent development to improve safety of vessels participating in yacht racing. Some improvements were proposed in the course of the discussion, which would be considered by ISAF, as appropriate.

### **Ports of refuge**

8.88 Recalling that this item was submitted to the Sub-Committee by MSC 73 only the week before the current session, it agreed:

- .1 that the issue was relevant to its work on SAR, as permitting a ship into a port might be one possibility to save lives;
- .2 to invite the Committee to include into the Sub-Committee's work programme a corresponding item on "Port of refuge" with one session to complete;
- .3 that more time was needed for detailed consideration of the matter on the national level;
- .4 to invite submissions on this issue to COMSAR 6; and
- .5 to invite the Committee to instruct the NAV Sub-Committee to consider the matter as a co-ordinating Sub-Committee.

### **Mass Rescue Operations (MROs)**

8.89 The Sub-Committee noted with appreciation the information provided by the United States in document COMSAR 5/8/14 on ways to improve readiness to rescue a large number of survivors and, recalling the work of the MSC Working Group on large passenger ships, invited the United States to make this information also available to MSC 74 for consideration by that Working Group. COMSAR 6 might be tasked by MSC 74 to consider the issue of mass evacuation/rescue operations further, in which case this document could assist in that work.

8.90 The delegation of the United States advised the Sub-Committee that considering the increased and ongoing interest in Mass Rescue Operations, a Mass Rescue Workshop is being co-sponsored by the United States Coast Guard and the International Council of Cruise Lines. The Workshop will be held in Jacksonville, Florida, the United States on 26 and 27 March 2001. Members were cordially invited to attend. Details on registration and cost of the workshop are available from the United States Coast Guard Office of Search and Rescue at tel. (202) 267 1943 or [gkney@comdt.uscg.mil](mailto:gkney@comdt.uscg.mil) or [dedwards@comdt.uscg.mil](mailto:dedwards@comdt.uscg.mil).

### **ILF resolution**

8.91 The Sub-Committee noted with appreciation the information provided by the ILF observer on a recent ILF resolution whereby “it was resolved that there is a need to encourage greater co-operation and harmony in the development of SAR capabilities through the world. This could be accomplished by encouraging IMO Member States to ratify the 1979 SAR Convention. In addition, all IMO Members should encourage their SAR services to join the ILF which can provide support and assistance to those services.”

### **COSPAS-SARSAT**

8.92 The Sub-Committee noted the discrepancies between the COSPAS-SARSAT data distribution plan (DDP) and the relevant IMO SAR circulars and agreed to invite COSPAS-SARSAT to update their documents for submission of the relevant annexes to COMSAR 6 for consideration; and invited Member Governments to co-ordinate on the national level the relevant information provided to the IMO and COSPAS-SARSAT Secretariats.

## **9 IMO STANDARD MARINE COMMUNICATION PHRASES**

### **General**

9.1 The Sub-Committee recalled that the agenda item “IMO Standard Marine Communication Phrases” was on the COM and COMSAR Sub-Committees’ work programme since 1995 and that COMSAR 1, noting that NAV 42 would consider the Standard Marine Communication Phrases (SMCPs) prepared by its Correspondence Group had invited:

- .1 Members to consider the report of the Group when circulated to NAV 42 and submit any comments and proposals directly to NAV 42; and
- .2 the Committee to retain this item in its work programme, for the time being, so that it can consider those parts of the SMCPs related to GMDSS radiocommunications and SAR and proposed one session needed for completion.

9.2 The Sub-Committee noted that MSC 68, following approval of MSC/Circ.794 on Standard Marine Communication Phrases (SMCPs) prepared by NAV 42, had invited Member Governments and maritime training institutes to conduct trials using SMCPs and to report the results of such trials well in advance for consideration by NAV 45, in order that it could, in co-operation with the COMSAR and STW Sub-Committees, finalize the SMCPs.

9.3 It was also recalled that MSC 71 had instructed COMSAR 4 to include, in the provisional agenda for COMSAR 5, an item on “IMO Standard Marine Communication Phrases”, which was subsequently approved by MSC 72.

9.4 The Sub-Committee also noted that:

- .1 NAV 45 had summarized the comments received on the results of the trials by Chile, Croatia, Germany, Iceland, Italy, Ukraine, Hong Kong, China, and ISF;
- .2 NAV 46 had considered and finalized the amended draft Standard Marine Communication Phrases contained in MSC/Circ.794, including a draft Assembly resolution, been issued as document NAV 46/16/Add.1, for submission to MSC 74 for approval; and
- .3 NAV 46 had agreed to submit the revised SMCPs to COMSAR 5 and STW 32 to review and report to MSC 74.

#### **Establishment of a drafting group**

9.5 Noting that no submissions had been received under this agenda item and following a general discussion in plenary, the Sub-Committee established a drafting group (DG 1) under the Chairmanship of Mr. K. Fisher (United Kingdom) and instructed it to:

- .1 review the annex to NAV 46/16/Add.1, in particular, relevant sections concerning distress, urgency, safety and SAR communications, for them to comply with the international standards set out in the ITU Radio Regulations and the IAMSAR Manual; and
- .2 prepare draft amendments, if any, and references to the appropriate publications and standards.

#### **Outcome of the drafting group**

9.6 Having considered the report of the Drafting Group (COMSAR 5/WP.1), the Sub-Committee agreed on the proposed amendments to SMCPs, given at annex 10, and invited the Committee to take them into account when considering and approving the amended draft Standard Marine Communication Phrases (NAV 46/16/Add.1, annex 1 to annex 16).

9.7 The Committee was also invited to delete the item “IMO Standard Marine Communication Phrases” from the Sub-Committee’s work programme, as the work on it had been completed.

### **10 DEVELOPMENT OF GUIDELINES FOR SHIPS OPERATING IN ICE-COVERED WATERS**

10.1 The Sub-Committee recalled that, COMSAR 4, following the framework agreed by MSC 71 (MSC 71/23, paragraph 9.16) for further work on the development of guidelines, had agreed that the requirements on radiocommunications set out in SOLAS Chapter IV were sufficient for ships operating in ice-covered waters, but that consideration might be given to operational aspects such as reception of maritime safety information, in particular information on ice. The Sub-Committee was also of the opinion that search and rescue matters should be considered in this context.

10.2 The Sub-Committee noted that DE 43 had established a working group to review the text of the draft guidelines and had agreed to refer the report of the working group (DE 43/WP.10) to

DE 44 together with the status report of the draft guidelines (Part 2 of the report of the Working Group), which had been prepared in collaboration with the Secretariat and issued as document DE 44/12.

10.3 The Secretariat informed the Sub-Committee that chapter 13 – “Communications” had been deleted from the text of the draft guidelines (DE 44/12, annex 1, page 37). However, the delegation of Canada had requested that a general comment, providing guidance on potential difficulties with radiocommunications encountered by ships operating at high latitude in Arctic ice-covered waters should be inserted under Chapter 13 on Communications. There was no agreement to include this item in the list of issues for further discussion and Canada had been invited to submit its request to DE 44 (DE 44/12, paragraph 5).

10.4 The Sub-Committee was also informed that preambular paragraphs 1.2 and 1.3 of the proposed draft guidelines state:

“1.2 These new Guidelines for Ships Operating in Arctic *ice-covered* waters are intended to address those additional provisions deemed necessary for consideration beyond existing requirements of the Convention in order to take into account the climatic conditions of ice-covered waters and to meet appropriate standards of maritime safety and pollution prevention.

1.3 The Guidelines are recommendatory, and their wording should be interpreted as providing recommendations rather than mandatory direction.”

10.5 Taking into account the above and noting that no documents on the issue had been submitted to this session, the Sub-Committee, after general discussion, agreed to reiterate its opinion expressed at COMSAR 4 (COMSAR 4/14, paragraph 10.3) that the requirements for radiocommunications set out in SOLAS Chapter IV were sufficient for ships operating in Arctic ice-covered waters.

10.6 The Committee was invited to note the Sub-Committee’s view on the issue and to delete the item “Development of guidelines for ships operating in ice-covered waters”, from the Sub-Committee’s work programme, as the work on it had been completed.

10.7 The Secretariat was instructed to convey this section of the report to DE 44, due to meet in March 2001.

## **11 WORK PROGRAMME AND AGENDA FOR COMSAR 6**

11.1 The Sub-Committee noted that MSC 71 and MEPC 43, having reviewed the Guidelines on the Organization and method of work of the Maritime Safety Committee and the Marine Environment Protection Committee and their subsidiary bodies in the light of experience gained with their application and with a view to improving them for the purpose of further rationalizing the work of the Committees and their subsidiary bodies, had approved MSC/Circ.931 and MEPC/Circ.366, which revoke circulars MSC/Circ.816 and MEPC/Circ.331, respectively.

MSC 73 decided that proposed modifications and amendments to the Guidelines (MSC 73/21/Add.3, annex 33) should, for the time being, be attached to the report of the Committee for reference and application as appropriate. They should be incorporated in the Guidelines at a later stage when a sufficient number of further amendments has been approved to justify a new set of the revised Guidelines.

The Committee considered a number of issues concerning the application of the Guidelines and:

- .1 re-affirmed its commitment to strict adherence to the Guidelines and that its subsidiary bodies should do the same;
- .2 in line with the provisions of paragraph 7 of the Guidelines, agreed that, at an appropriate time, a meeting should be convened of the Chairmen of the Committees and Sub-Committees to examine any matters pertinent to the effective conduct of business of the Committees and their subsidiary bodies; and
- .3 instructed the Secretariat to inform the Sub-Committees accordingly.

11.2 The Sub-Committee also noted that MSC 72, as proposed by COMSAR 4, had decided to include, in the Sub-Committee's work programme, a new high priority item on "Procedures for responding to DSC alerts", with 2 sessions needed to complete the item. The Committee also decided to delete the item on "Safety on passenger submersible craft" from the Sub-Committee's work programme as work on the item had been completed.

11.3 It was noted further that as follow-up action to the twenty-first session of the Assembly, in the context of resolution A.888(21) - Criteria for the provision of mobile-satellite communication systems in the Global Maritime Distress and Safety System (GMDSS), MSC 72 had included, in the Sub-Committee's work programme, 2 new high priority items on:

- .1 "Amendments to SOLAS chapter IV pursuant to the criteria set out in resolution A.888(21)", with 3 sessions needed to complete the item; and
- .2 "Development of a procedure for recognition of mobile-satellite systems", with 2 sessions needed to complete the item.

11.4 The Secretariat informed the Sub-Committee that MSC 73 had not considered any new work programme items for any sub-committees.

11.5 Taking into account the progress made at this session and the provisions of the agenda management procedure, the Sub-Committee revised its work programme (COMSAR 5/WP.6) based on that approved by MSC 72 (COMSAR 5/2, annex) and prepared a revised work programme and a draft provisional agenda for COMSAR 6, as set out in annex 11, for consideration and approval by the Committee. While reviewing the work programme, the Sub-Committee agreed to invite the Committee to:

- .1 delete the following work programme items as work on them has been completed:
  - .1.1 item H.1 Work consequential to the 1988 GMDSS Conference;
  - .1.2 item H.1.1 Review of locating functions in the GMDSS;
  - .1.3 item H.2 VTS and automatic ship identification transponder/transceiver systems;
  - .1.4 item H.3 IMO Standard Marine Communication Phrases;
  - .1.5 item H.4 Review of the Joint IMO/IHO/WMO MSI Manual; and

- .1.6 item L.1 Development of guidelines for ships operating in ice-covered waters;
- .2 extend the target completion date of the following work programme items:
  - .2.1 item 6.1 Harmonization of aeronautical and maritime search and rescue procedures, including SAR training matters 2002; and
  - .2.2 item 7 Emergency radiocommunications: false alerts and interference - 2002;
- .3 replace the number of sessions needed for completion by a target completion date, for the following work programme items:
  - .3.1 item H.5 Procedures for responding to DSC alerts – 2003; and
  - .3.2 item H.8 Development of a procedure for recognition of mobile-satellite systems – 2003; and
- .4 include new items:
  - .4.1 item H.5 Development of maritime radiocommunication systems and technology - 2003;
  - .4.2 item H.6 Bridge-to-bridge radiocommunications – 2003; and
  - .4.3 item H.7 Port of refuge – 1 session.

### **Arrangements for the next session**

11.6 The Sub-Committee anticipated that working groups on the following subject may be established at COMSAR 6:

- .1 GMDSS operational matters;
- .2 SAR matters; and
- .3 technical matters.

### **Intersessional meetings**

11.7 The Sub-Committee noted and agreed that the eighth session of the IMO/ICAO Joint Working Group on Harmonization of Aeronautical and Maritime Search and Rescue was scheduled to be held in Montreal, Canada, from 20 to 24 August 2001; and invited the Committee to approve this intersessional meeting.

### **Date of the next session**

11.8 The Sub-Committee noted that its sixth session had been tentatively scheduled to take place from 18 to 22 February 2002.

## **12 ELECTION OF CHAIRMAN AND VICE-CHAIRMAN FOR 2001**

In accordance with rule 16 of the Rules of Procedure of the Maritime Safety Committee, the Sub-Committee unanimously re-elected Mr. V. Bogdanov (Russian Federation), as Chairman and Mr. U. Hallberg (Sweden), as Vice-Chairman for 2001.

## **13 ANY OTHER BUSINESS**

### **Outcome of the twenty-first session of the Assembly**

13.1 The Sub-Committee noted that the Assembly, at its twenty-first session, had adopted resolution A.886(21) – *Procedure for the adoption of, and amendments to, performance standards and technical specifications*, by means of which resolution A.825(19) had been revoked and the Maritime Safety Committee and/or the MEPC had been authorized to perform, on behalf of the Organization, the function of adopting performance standards and technical specifications as well as amendments thereto.

### **Service intervals of life-saving appliances and radiocommunication equipment**

13.2 The Sub-Committee also noted that MSC 72 had approved MSC/Circ.955 on Servicing of life-saving appliances and radiocommunication equipment under the harmonized system of survey and certification (HSSC), aimed at eliminating the conflict of regulations in two instruments, i.e. the relevant regulations of Chapters III and IV of SOLAS 74, as amended, and the 1988 SOLAS Protocol introducing the HSSC.

### **Development of a draft IMO model course for training of GMDSS Second-Class radio electronics**

13.3 The Sub-Committee noted, with appreciation, the information provided by the Russian Federation (COMSAR 5/INF.10) on the completion, by the Admiral Makarov State Maritime Academy (St. Petersburg) in consultation with Polish experts from the Maritime Academy of Gdynia, Poland, of the development of the draft IMO model course on the GMDSS second-class radio electronic certificate.

13.4 It was noted in particular, that:

- .1 the Model course is intended for training the personnel having qualification in electronics, for performance of the functions outlined by Article S47 of the Radio Regulations;
- .2 the Model course consists of 10 modules:
  - Fundamentals of Radio Systems;
  - Analog and Digital Circuit Theory;
  - Microprocessors in Control Systems;
  - PC Software and Hardware;

- Radar and ARPA-Basic Principles and Maintenance;
- Radionavigation Systems and Equipment-Basic Principles and Maintenance;
- Electronavigational Equipment (navigational aids);
- GMDSS Organization, Communication Regulations and Procedures;
- General Principles of Ship Radiocommunication Equipment Maintenance and Repair; and
- The English Language in the GMDSS; and

.3 the total amount of training hours required is 584.

13.5 Taking into account the above information and acknowledging the need for such a course in connection with the implementation of the GMDSS, the Sub-Committee invited Member Governments concerned to consider the draft Model course on training of GMDSS second-class radio electronics, when discussed at STW 32, and to recommend its validation and publication as an IMO Model Course.

13.6 The Secretariat was requested to convey the above paragraphs to STW 32, due to meet in January 2001.

#### **Provisions for the attachment of a two-way VHF radiotelephone apparatus to the clothing of the user**

13.7 The Sub-Committee noted the information provided by Norway (COMSAR 5/INF.15) on experiences gained from recent maritime distress incidents at the Norwegian coast indicating that the risk of losing a two-way VHF radiotelephone apparatus into the sea could be reduced by providing such apparatus with a short wrist strap.

If the two-way VHF radiotelephone apparatus is lost during evacuation from a ship in distress, there might be no possibility for the shipwrecked persons to communicate with other vessels or coast radio stations from the survival craft. When attaching the apparatus to the clothing by use of just a clip, it was normally not possible to use it for communications without opening the clip, giving higher risk of losing the apparatus into the sea. The possibility of losing the equipment, when being used for communications during a distress incident, was less if attached to the hand wrist of the user.

13.8 In connection with the above the Sub-Committee recalled that paragraph 2.3.11 of annex 1 to resolution A.809(19) – Performance standards for survival craft two-way VHF radiotelephone apparatus, required that *“The equipment (two-way VHF radiotelephone apparatus) should have provisions for its attachment to the clothing of the user;”*, without specifying what kind of attachment to be used.

13.9 Having briefly discussed the issue, the Sub-Committee concurred with the proposal and invited Norway to submit their justified proposal on amending resolution A.809(19) to the Committee for consideration and appropriate instructions to the Sub-Committee.

## Expressions of appreciation

13.10 The Sub-Committee expressed appreciation to the following delegates and observers and members of the Secretariat, who had recently relinquished their duties, retired or were transferred to other duties or were about to, for their invaluable contribution to its work and wished them a long and happy retirement or, as the case might be, every success in their new duties:

- Mr. R. Wilson (United Kingdom);
- Captain V.S. Knyazev (Russian Federation);
- Mr. K. Bouquist (ICAO); and
- Captain E.O. Agbakoba (Secretariat).

## 14 ACTION REQUESTED OF THE COMMITTEE

14.1 The Committee, at its seventy-fourth session, is invited to:

- .1 approve the draft COMSAR Circular on the International NAVTEX Service; and note the Sub-Committee's decision to forward it to IHO (paragraphs 3.19 and 3.20 and annex 2\*);
- .2 agree, in the interest of operational safety, that the NAVTEX and International SafetyNET Manuals should be made more readily available by being placed on the IMO web site (paragraph 3.23);
- .3 endorse the Sub-Committee's action in issuing COMSAR/Circ.24 – List of NAVAREA Co-ordinators, to supersede COMSAR/Circ.20 (paragraph 3.28);
- .4 approve the proposed draft amendments to the Joint IMO/IHO/WMO Manual on MSI and instruct the Secretariat to issue the amended Manual as an IMO publication (paragraph 3.34 and annex 3);
- .5 endorse the Sub-Committee's action in issuing COMSAR/Circ.25 - Procedure for responding to DSC distress alerts by ships, to revoke COMSAR/Circs.2 and 21 (paragraphs 3.49 and 3.50);
- .6 approve the proposed draft amendments to SOLAS chapter IV, together with the associated draft MSC resolution, for adoption at MSC 75 (paragraph 3.56 and annex 4);
- .7 endorse the Sub-Committee's action in issuing COMSAR/Circ.26 - Operational and service implications for numbering plan formats for mobile-satellite systems participating in the GMDSS (paragraph 5.14);
- .8 note the possible loss of the frequency spectrum currently used by maritime navigational radars; and instruct the NAV Sub-Committee to review the current

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\* All references are to paragraphs of, and annexes to, the report of COMSAR 5 (COMSAR 5/14).

- requirements in co-operation with the Sub-Committee (paragraph 5.17 and annex 5);
- .9 note the establishment of a correspondence group on ITU matters to analyse and comment on the outcome of WRC-2000 (paragraph 5.20);
  - .10 adopt, in accordance with resolution A.886(21), the proposed draft MSC resolution on Adoption of amendments to resolution A.810(19) – Performance standards for float-free satellite emergency position-indicating radio beacons (EPIRBs) operating on 406 MHz (paragraph 6.10 and annex 6);
  - .11 note the establishment of a correspondence group to consider the development of a false distress alerts monitoring and reporting system (paragraph 7.9);
  - .12 inform the Working Group on Large passenger ships safety that the Joint ICAO/IMO Working Group on Harmonization of Aeronautical and Maritime SAR is considering mass rescue operation (MRO) matters (paragraph 8.11);
  - .13 approve the proposed draft amendments to SOLAS regulation V/21 to make the carriage of Volume III of the IAMSAR Manual mandatory, together with the associated draft MSC resolution, for adoption at MSC 75 (paragraph 8.15 and annex 7);
  - .14 adopt the proposed draft amendments to the IAMSAR Manual and approve the associated draft MSC circular (paragraph 8.24 and annex 8);
  - .15 endorse the Sub-Committee's action in combining SAR.2 and SAR.3 circular data and in issuing COMSAR/Circ.27 on Data format for new combined SAR.2 and SAR.3 circulars (paragraphs 8.53 to 8.56);
  - .16 approve the draft MSC Circular on Guidelines for the preparation of plans for co-operation between search and rescue services and passenger ships, to revoke MSC/Circ.864 (paragraphs 8.57 to 8.66 and annex 9);
  - .17 instruct the Working Group on Large passenger ships safety to note action .16 above and to provide guidance with regard to reporting the arrival and stay of ships in SAR regions (paragraph 8.65);
  - .18 endorse the Sub-Committee's action in instructing the Secretariat to consult with ILO and WHO on the development of a list of contents for medical first aid kits for certain ro-ro passenger ships (paragraph 8.70);
  - .19 note the establishment, of a correspondence group of interested parties, including medical doctors, to expedite work on the development of a list of contents for medical first aid kits for certain ro-ro passenger ships, subject to the Committee assigning a high priority status to the sub-item (paragraph 8.71);
  - .20 note the Sub-Committee's discussion on the outcome of the 2000 Florence Conference; the general endorsement of resolutions No. 1 to 4 thereof; and the instruction to the Secretariat to obtain legal advice on resolution No. 5 (paragraphs 8.76 to 8.85);

- .21 instruct the NAV Sub-Committee to consider port of refuge matters as the co-ordinating Sub-Committee (paragraph 8.88.5);
- .22 take into account the proposed amendments to the Standard Marine Communication Phrases (SMCPs) when considering the amended draft SMCPs (NAV 46/16/Add.1, annex 1 to annex 16), for approval and submission to the seventy-second session of the Assembly for adoption (paragraph 9.6 and annex 10);
- .23 note the reiterated opinion of the Sub-Committee that the SOLAS Chapter IV radiocommunication requirements are sufficient for ships operating in Arctic ice-covered waters and that DE 44 has been informed accordingly (paragraphs 10.5 to 10.7);
- .24 approve the convening of the eighth session of the Joint ICAO/IMO Working Group on Harmonization of Aeronautical and Maritime SAR scheduled to take place in Montreal, Canada, in August 2001 (paragraph 11.7); and
- .25 approve the report in general.

14.2 In reviewing the work programme of the Sub-Committee, the Committee is invited to consider the revised work programme suggested by the Sub-Committee (annex 11) in general and, in particular to:

- .1 delete the item "Review of the Joint IMO/IHO/WMO MSI Manual", as that work has been completed (paragraph 3.35);
- .2 note the Sub-Committee's opinion that there is a need to include the items "Development of maritime radiocommunication systems and technology" and "Bridge-to-bridge radiocommunications", as suggested by France (MSC 72/21/2 and MSC 72/21/3), in the work programme and in the provisional agenda for COMSAR 6 (paragraph 3.46);
- .3 extend the target completion date of the agenda item "Emergency radiocommunications: False alerts and interference" to 2002 (paragraphs 7.9 and 7.11);
- .4 include in the work programme of the Sub-Committee and the provisional agenda for COMSAR 6, a new high priority sub-item "Development of a list of contents for a medical first aid kit for certain ro-ro passenger ships for utilization by a medical doctor" under the existing item "Matters concerning search and rescue, including those related to the 1979 SAR Conference and introduction of the GMDSS" with one session to complete (paragraph 8.69);
- .5 include a new work programme item "Port of refuge" with one session to complete and assign a priority status, taking into account the Sub-Committee's discussion on the matter, (paragraph 8.88);
- .6 delete the item "IMO Standard Marine Communication Phrases", as that work has been completed (paragraph 9.7);

- .7 delete the item “Development of guidelines for ships operating in ice-covered waters”, as that work has been completed (paragraph 10.6);
- .8 delete, as that work has been completed, the following items:
  - .8.1 “Work consequential to the 1988 GMDSS Conference”;
  - .8.2 “Review of locating functions in the GMDSS”; and
  - .8.3 “VTS and automatic ship identification transponder/transceiver systems” (paragraphs 11.5.1.1 to 11.5.1.3);
- .9 extend the target completion date for the item “Harmonization of aeronautical and maritime search and rescue procedures, including SAR training matters” to 2002 (paragraph 11.5.2.1); and
- .10 replace the number of sessions needed for completion by a target completion date for the following items:
  - .10.1 “Procedures for responding to DSC alerts” – 2003; and
  - .10.2 “Development of a procedure for recognition of mobile-satellite systems” – 2003.

14.3 The Committee is also invited to approve the proposed provisional agenda for the Sub-Committee’s sixth session (annex 11), which has been developed using the agenda management procedure.

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## ANNEX 1

## AGENDA FOR THE FIFTH SESSION AND LIST OF DOCUMENTS

**1 Adoption of the agenda**

COMSAR 5/1	Secretariat	Provisional agenda for the fifth session
COMSAR 5/1/1	Secretariat	Annotations to the provisional agenda

**2 Decisions of other IMO bodies**

COMSAR 5/2	Secretariat	Decisions of the twenty-first session of the Assembly and MSC 72
COMSAR 5/2/1	Secretariat	Decisions of NAV 45, STW 31, DE 43 and NAV 46
COMSAR 5/2/2	Secretariat	Decisions of MSC 73

**3 Global Maritime Distress and Safety System (GMDSS)**

COMSAR 5/3	France	Watchkeeping technology: development of maritime radiocommunications systems and technology
COMSAR 5/3/1	Chairman, the International NAVTEX Co-ordinating Panel	International NAVTEX service
COMSAR 5/3/2	Russian Federation	On Circulars COMSAR/Circ.2 and COMSAR/Circ.21
COMSAR 5/3/3	IHO and WMO	Operational and technical co-ordination of MSI services
COMSAR 5/3/4	Norway	Harmonization of GMDSS requirements for radio installations on board SOLAS ships – Interpretation of term “occasionally” as mentioned in paragraph 2.1.2 of resolution A.702(17) when used in connection with the implementation of the GMDSS on fishing vessels
COMSAR 5/INF.5	Norway	Report of the 10 <sup>th</sup> Baltic/Barents Sea Regional Co-operation Meeting on the GMDSS (BBRC/GMDSS-10)

COMSAR 5/INF.6	Denmark	Report of the 11 <sup>th</sup> session of the Baltic/Barents Sea Regional Co-operation on the GMDSS (BBRC/GMDSS-11)
COMSAR 5/INF.7	France	Status of French participation in the World-Wide Navigational Warning Service (WWNWS)
COMSAR 5/INF.8	Iceland	Tenth North Sea Regional Co-ordination Conference under the GMDSS (10 <sup>th</sup> NRC/GMDSS)
COMSAR 5/INF.11	Canada	Sinking of the bulk carrier "FLARE"
COMSAR 5/INF.12	Norway	Matters relating to the GMDSS Master Plan – VHF DSC in the North Sea
MSC 72/17/2, Annex 6 to annex 2	Secretariat	Mission of experts to, and regional seminar and workshop on piracy and armed robbery against ships held in Lagos, Nigeria (October 1999)
COMSAR 5/WP.3		Report of the Operational Working Group

#### **4 Development of criteria for general communications**

COMSAR 5/4	France	Bridge-to-bridge communications
COMSAR 5/4/1	France	General communications in the GMDSS
COMSAR 5/4/2	Denmark and Finland	Considerations on general radiocommunications
COMSAR 5/WP.5		Report of the Technical Working Group

#### **5 ITU maritime radiocommunication matters**

COMSAR 5/5	Secretariat	Outcome of the World Radiocommunication Conference, 2000
COMSAR 5/5/1	United Kingdom	Exhaustion of MMSI numbers and responsible use of the limited ITU numbering resource
COMSAR 5/5/2	Norway	Maritime Digital VHF – Revitalizing the use of the maritime VHF frequencies

COMSAR 5/5/3	Netherlands	ITU World Radiocommunication Conference
COMSAR 5/5/4	United Kingdom	Threat to the Radar Spectrum
[COMSAR 5/WP.5		Report of the Technical Working Group]

## 6 Satellite services (Inmarsat and COSPAS-SARSAT)

COMSAR 5/6	IMSO	Information on the GMDSS performance of Inmarsat Ltd.
COMSAR 5/6/Add.1	IMSO	Report on the GMDSS performance of Inmarsat Ltd.
COMSAR 5/6/1	COSPAS-SARSAT	Status of the COSPAS-SARSAT Programme
COMSAR 5/6/2	COSPAS-SARSAT	Proposed draft amendments to resolution A.810(19)
COMSAR 5/6/3	France	COSPAS-SARSAT – Test report and recommendation on the use of 406 MHz EPIRBs
COMSAR 5/6/4	France	Inmarsat – Comments on paragraph 5 of the IMSO report on the performance of Inmarsat Ltd.
COMSAR 5/WP.2	Chairman	Draft MSC resolution – Adoption of amendments to resolution A.810(19)

## 7 Emergency radiocommunications: false alerts and interference

COMSAR 5/7	COSPAS-SARSAT	False alerts
COMSAR 5/7/1	COSPAS-SARSAT	Interference in the 406.0 – 406.1 MHz Frequency Band
COMSAR 5/7/2	Norway	Reports on false alerts – System Monitoring and Reporting (SMR)
COMSAR 5/7/3	CIRM	Draft Guidelines for shore-based maintenance of satellite EPIRBs and ancillary devices
COMSAR 5/7/4	Argentina	Measures to reduce the number of false distress alerts for practical use of the GMDSS

COMSAR 5/7/5	Japan	Measures to reduce the number of false distress alerts for practical use of the GMDSS
COMSAR 5/INF.3	Singapore	Statistics of false alerts received by Singapore Rescue Co-ordination Centre
COMSAR 5/INF.4	Russian Federation	Test of Digital Selective Calling (DSC) Systems and Algorithmic Verification; Tests of Narrow Band Direct-Prining (NBDP) Telegraph Equipment
COMSAR 5/INF.9	Russian Federation	Professional refresher and updating training of GMDSS operators and measures aimed at reduction of false distress alerts
COMSAR 5/INF.14	Norway	Form used for reporting false alerts
[COMSAR 5/WP.3		Report of the Operational Working Group]

**8 Matters concerning search and rescue, including those related to the 1979 SAR Conference and the introduction of the GMDSS**

COMSAR 5/8	Secretariat	Report of the seventh ICAO/IMO
COMSAR 5/8/Add.1		Joint Working Group on Harmonization of Aeronautical and Maritime Search and Rescue
COMSAR 5/8/1	ISAF	Long distance yacht racing
COMSAR 5/8/2	ICS	Medical assistance at sea
COMSAR 5/8/3	Secretariat	Florence Conference on Maritime Search and Rescue (SAR) and the Global Maritime Distress and Safety System (GMDSS)
COMSAR 5/8/4	France	Assistance to be provided to certain MRCCs confronted with air accidents
COMSAR 5/8/5	France	Model agreement (or administrative arrangement) on search and rescue between a State responsible for a search and rescue region (SRR) and another State whose coasts are situated in its SRR

COMSAR 5/8/6	France	Principles for the preparation and distribution of circular SAR.7/Circ.x
COMSAR 5/8/7	France	Search and rescue statistics
COMSAR 5/8/8	Chile	Adventure navigation and the International Convention on Maritime Search and Rescue
COMSAR 5/8/9	United Kingdom	SOLAS regulation V/15(c) and SAR Co-operation Plans for passenger ships transiting many SAR regions – Revision of MSC/Circ.864
COMSAR 5/8/10	United Kingdom	SOLAS regulation V/15(c) and SAR Co-operation Plans for passenger ships transiting many SAR regions
COMSAR 5/8/11	ICCL	Proposed SAR co-operation plans for passenger ships
COMSAR 5/8/12	France and United Kingdom	Updating or replacement of SAR.2/Circ.x
COMSAR 5/8/13	Russian Federation	GMDSS Coast Station Operator's Course (GMDSS CSOC)
COMSAR 5/8/14	United States	Mass Rescue Operations (MROs)
COMSAR 5/INF.2	Secretariat	Reports on Maritime Search and Rescue (SAR) and the Global Maritime Distress and Safety System (GMDSS) Conferences (1981 to 1998)
COMSAR 5/INF.13	United Kingdom	GMDSS Coast Station Operator Certificate (CSOC) Course
MSC 72/9/2	United Kingdom	Interpretation of SOLAS regulation V/15(c)
COMSAR 5/WP.4		Report of the SAR Working Group
COMSAR 5/WP.4/Add.1		Report of the SAR Working Group
COMSAR 5/WP.4/Add.2		Report of the SAR Working Group
COMSAR 5/WP.4/Add.1/Corr.1		Report of the SAR Working Group

**9 IMO Standard Marine Communication Phrases**

COMSAR 5/WP.1 Drafting Group Report of the Drafting Group

**10 Development of guidelines for ships operating in ice-covered waters**

No documents submitted

**11 Work programme and agenda for COMSAR 6**

COMSAR 5/WP.6 Report of the Chairman

**12 Election of Chairman and Vice-Chairman for 2000**

No documents submitted

**13 Any other business**

COMSAR 5/INF.10 Russian Federation Development of a draft IMO Model Course for training of GMDSS Second-Class Radio Electronics

COMSAR 5/INF.15 Norway Provisions for the attachment of a two-way VHF radiotelephone apparatus to the clothing of the user

**14 Report to the Maritime Safety Committee**

COMSAR 5/WP.7 Draft Report to the Maritime Safety Committee  
COMSAR 5/WP.7/Add.1  
COMSAR 5/WP.7/Add.2

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**ANNEX 2****DRAFT COMSAR CIRCULAR****International NAVTEX Service**

1 The Sub-Committee on Radiocommunications and Search and Rescue (COMSAR), at its fifth session (11 to 15 December 2000), considered a number of recommendations aimed at reducing interference and volume of information in the International NAVTEX Service. The recommendations are given at the annex.

2 The COMSAR Sub-Committee agreed that it was important to encourage Administrations to migrate non-English language broadcasts and broadcasts of information provided specifically for non-SOLAS vessels from 518 kHz to 490 kHz or 4209.5 kHz, as appropriate. The Sub-Committee urged Administrations to complete this migration by 1 January 2005.

3 Member Governments are invited to bring this circular to the attention of all Maritime Safety Information (MSI) providers and National Telecommunication Administrations for consideration and action as appropriate.

## ANNEX

### INTERNATIONAL NAVTEX SERVICE

#### Interference between stations and use of 490 kHz

1 Although NAVTEX continues to be generally reliable and an effective medium for the promulgation of Maritime Safety Information, the world-wide infrastructure continues to expand and the volume of information that each Administration disseminates through a NAVTEX service on 518 kHz continues to increase. There is now a real danger that in some geographical areas, without firm management, both the system and system users may become overloaded with information on this frequency.

2 Many stations are filling their allotted 10 minute time slots and an increasing number are over-running. Instances of interference with neighbouring stations, as a result of over-running the time allocation, are also increasing. Where adjacent stations have B<sub>1</sub> characters which follow alphabetically (i.e. time slots abut), if the first station over runs, it may mask the phasing signal of the second station such that, to the user, it seems as if the second station is off the air. Safety-critical information from the second station, although broadcast, may not be received by the system users. Over-run is usually caused by one or more of the following:

- .1 a significant increase in safety-critical activity such as cable laying. Navigation Warnings promulgating such activity often include numerous waypoints which are listed by latitude and longitude;
- .2 meteorological information provided in a manner which is not concise and easily assimilated by the system user or for a much wider area than is covered by the NAVTEX station;
- .3 additional information provided for non-SOLAS system users e.g. longer-range weather forecasts for fishing and recreational vessels (see paragraph 3 below); and
- .4 information to meet specific national requirements. This includes national language broadcasts and other information which is sometimes required to be broadcast by national statute rather than IMO resolutions.

3 As the GMDSS spreads to non-SOLAS mariners, their requirements for information are often different from the SOLAS ships and may be determined at a national level. SOLAS ships trading internationally usually pass through the area of coverage of a NAVTEX transmitter in a day; for them a 24 hour weather forecast usually suffices. However, fishing vessels and recreational vessels often remain in the same vicinity for several days and may require much longer range forecasts which take up more transmission time.

4 In order to keep the quantity of information that is broadcast on 518 kHz to manageable levels and to reduce avoidable interference on this frequency, it is recommended that:

- .1 Administrations monitor the volume of data broadcast and, together with adjacent Administrations, actively manage the system to ensure that interference caused by over-running allocated time slots, is minimised; and

- .2 Administrations migrate non-English language broadcasts, and broadcasts of information provided specifically for non-SOLAS vessels from 518 kHz to a national broadcast on 490 kHz or 4209.5 kHz as required. B<sub>1</sub> characters for these frequencies will be allocated by the International NAVTEX Co-ordinating Panel, on request.

5 Interference between stations with the same B<sub>1</sub> character/time slot, but located in different regions is also increasing, particularly at night, as the number of operational NAVTEX stations increases. This is occasionally caused by atmospheric conditions, but is generally caused by excessive power output from one of the stations. It is recommended that Administrations restrict the power output from their transmitters to that required to cover the designated area, particularly at night, in order to avoid interference. As a general rule, transmitter power should never exceed 1 kW by day and 300 watts by night; use of as much as 7 kW has been noted in extreme cases of reported interference.

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## ANNEX 3

**DRAFT AMENDMENTS TO THE JOINT IMO/IHO/WMO MANUAL  
ON MARITIME SAFETY INFORMATION (MSI)  
(COMSAR/Circ.15)**

**Proposed Amendments to COMSAR/Circ.15, as follows :**

**Cover page**, the third line, after (MSI) delete “prepared by IHO”

In the **annex**:

**Page 1**, replace the words “February 1998” by the words “December 2000”

**Page 2**, add the word “Notification” after the words “Search and Rescue”

**Page 2**, add the new subject “Procedures for amending the Joint IMO/IHO/WMO Manual on MSI – 6”

**Page 3**, replace existing paragraph 3 with the following:

“The document contains sections from the IMO Assembly resolution A.706(17), "World-Wide Navigational Warning Service" and relevant sections of the WMO Publication "Manual on Marine Meteorological Services.”

**Page 4** renumber the footnotes and insert “(See Note)” 1 in the second line of the first paragraph next to the “high seas” with the following new footnote 1:

"1 "Metereological Warnings and Forecasts for the High Seas" is the term used by the World Meteorological Organization (WMO) to refer to meteorological information for all sea areas."

**Page 6**, add at the end of paragraphs 2.2.1.3 and 2.2.1.4 “, as amended” and in 2.2.1.8 also add after Publication 951 “, as amended”

**Page 8**, add a new paragraph after 2.3.5:

"2.3.6 In the event of failure of normal transmission facilities, an alternative means of transmission should be utilised. A NAVAREA Warning and a Coastal Warning, if possible, should be issued detailing the failure, its duration and, if known, the alternative route for the dissemination of MSI."

**Page 9**, first line insert after “alerts” the word “notifications”

**Page 10**, in the footnote change paragraph number “4.2.1.3.13” by “4.2.1.3.12”

**Page 11**, add a new subparagraph:

".14 only at the request of the controlling RCC when SAR operations have been stood down after a fruitless search, or after failing to find a ship alongside in a port search, or when a ship is several days overdue and contact cannot be established."

**Page 11**, insert, "as amended," after IMO resolution A.706(17) in paragraph 3.1.2

**Page 23**, table B9 delete the "Note" completely

**Page 26**, align the positions in the e.g. "165-02.81E"

**Page 33**, replace by the following:

## **"5 SEARCH AND RESCUE NOTIFICATION**

Communications related to search and rescue operations such a distress alerts, co-ordination of operations, local communications and positioning signals are never MSI, even when (for some shore-to-ship alerts) they use the International SafetyNET or NAVTEX services which are also used for MSI. This guide, therefore, does not apply to them.

Search and rescue operations may, however, involve the broadcasting of MSI in the navigational warning category in the following two cases, described in 3.1.1.6 and 3.1.1.14 of this manual:

A. "at the request of the controlling maritime rescue co-ordination centre (MRCC), notification of ships and aircraft on or over the open sea reported in distress, seriously overdue or missing (when search and rescue operations have been stood down after a fruitless search, when failing to find a ship alongside in a port search, or when a ship is several days overdue and contact cannot be established)".

This type of navigational warning may seem similar to an alert message. However, it is completely different in nature. An alert message is legally binding on the captain to intervene (in accordance with the provisions of SOLAS regulation V/33 or national legislation). A navigational warning signalling the disappearance of a ship is merely a request for collaboration with the SAR service, without in any way changing the normal operation of the ship, to complement the active search in progress or when a search has been fruitless or impracticable.

Key Subject	Comments
95 FOOT FISHING VESSEL "NAME" UNREPORTED ON VOYAGE FROM MIAMI TO GIBRALTAR. REPORT SIGHTINGS TO COAST GUARD MIAMA	It may be desirable to add some descriptive features of the vessel; do not use the expression "assistance required"

B. Information on “areas where search and rescue (SAR) and anti-pollution operations are being carried out (for avoidance of such areas)”.

This situation is cover by the “Miscellaneous” cases described in B8 above. Such navigational warnings should only be broadcast at the request of an MRCC or at least after the broadcasting service has confirmed with the MRCC that no further assistance is requested.

Key Subject	Comments
RESCUE OPERATION IN PROGRESS, POSITION_____, WIDE BERTH REQUESTED	

## **6 PROCEDURE FOR AMENDING THE JOINT IMO/IHO/WMO MANUAL ON MSI**

1 Proposed amendments to the Joint IMO/IHO/WMO Manual on MSI should be submitted to the Maritime Safety Committee for evaluation.

2 Amendments to the Manual should normally be adopted at intervals of approximately two years or at such longer periods as may be determined by the Maritime Safety Committee. Amendments adopted by the Maritime Safety Committee will be notified to all concerned, will provide at least 12 months’ notification and will come into force on 1 January of the following year.

3 The agreement of the International Hydrographic Organization and World Meteorological Organization, and the active participation of other bodies, as it might be necessary, should be sought according to the nature of the proposed amendments.

4 When the proposals for amendment have been examined in substance, the Maritime Safety Committee will entrust the Sub-Committee on Radiocommunications and Search and Rescue with the ensuing editorial tasks."

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## ANNEX 4

## DRAFT RESOLUTION MSC...(75)

ADOPTION OF AMENDMENTS TO THE INTERNATIONAL CONVENTION  
FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING FURTHER article VIII(b) of the International Convention for the Safety of Life at Sea (SOLAS), 1974, hereinafter referred to as "the Convention", concerning the procedures for amending the Annex to the Convention, other than the provisions of chapter I thereof,

HAVING CONSIDERED, at its [seventy-fifth] session, amendments to the Convention proposed and circulated in accordance with article VIII(b)(i) thereof,

1. ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the Convention, the text of which is set out in the Annex to the present resolution;
2. DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that the amendments shall be deemed to have been accepted on [1 January 2006], unless, prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant fleet, have notified their objections to the amendments;
3. INVITES Contracting Governments to note that, in accordance with article VIII(b)(vii)(2) of the Convention, the amendments shall enter into force on [1 June 2006] upon their acceptance in accordance with paragraph 2 above;
4. REQUESTS the Secretary-General, in conformity with article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in the Annex to all Contracting Governments to the Convention;
5. FURTHER REQUESTS the Secretary-General to transmit copies of this resolution and its Annex to Members of the Organization, which are not Contracting Governments to the Convention.

ANNEX

**PROPOSED AMENDMENTS TO THE 1974 SOLAS CONVENTION, AS AMENDED**

**CHAPTER IV**

**RADIOCOMMUNICATIONS**

**Regulation 1 - Application**

- 1 Paragraphs 3, 4, 5, 6 and 7 are deleted.
- 2 Existing paragraph 8 is renumbered as paragraph 3.

**Regulation 3 - Exemptions**

- 3 Paragraph 2.3 is deleted.
- 4 Insert the word “and” between paragraphs 2.1 and 2.2.

**Regulation 7 - Radio Equipment: General**

- 5 Paragraphs 2, 3 and 4 and the related footnotes are deleted.
- 6 Existing paragraph 5 is renumbered as paragraphs 2.

**Regulation 12 - Watches**

- 7 Paragraph 3, replace the date “1 February 1999” with “1 February 2005” and delete the related footnote.
- 8 Paragraph 4 and the related footnote are deleted.

**\*[Regulation 14 - Performance standards**

- 9 Paragraph 1, the second sentence, delete the words “Subject to paragraph 2.”
- 10 Paragraph 2 is deleted.

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\* Text in [ ], as instructed by COMSAR 5, has been added by the Secretariat.

## **Appendix**

### **CERTIFICATES**

11 The Records of Equipment, Forms P, R and C are amended as indicated hereunder.

#### **Record of Equipment for the Passenger Ship Safety Certificate (Form P)**

##### **1 Section 3 Details of radio facilities**

Items 7 and 8 of the table and related footnotes 2 and 3 are deleted.

#### **Record of Equipment for the Cargo Ship Safety Radio Certificate (Form R)**

##### **2 Section 2 Details of radio facilities**

Items 7 and 8 and related footnotes 1 and 2 are deleted.

Section 4 is deleted.

#### **Record of Equipment for the Cargo Ship Safety Certificate (Form C)**

##### **3 Section 3 Details of radio facilities**

Items 7 and 8 and related footnotes 2 and 3 are deleted.]

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**ANNEX 5****A note by COMSAR 5 to the NAV Sub-Committee**

1 There is growing pressure on the areas of the radio spectrum currently used by navigation radars. The two bands concerned (2.9 – 3.1 GHz & 9.2 – 9.5 GHz) are both widely utilised as they have complimentary attributes in terms of range, accuracy and detection capability in different environmental conditions. A danger exists that parts of these bands may be re-allocated by ITUs and marine navigation radars will be limited to a smaller part of the spectrum and/or required to share with other services. Either outcome will be detrimental to the safety of navigation and may necessitate the use of more expensive radar equipment.

2 In the light of the above, the COMSAR Sub-Committee invited the NAV Sub-Committee to consider information given in the annex and take action as appropriate.

## ANNEX

### **THE THREAT TO CURRENT MARITIME SAFETY RADIONAVIGATION SERVICES IN THE FREQUENCY BANDS 2.9 – 3.1 GHz AND 9.2 – 9.5 GHz**

#### **Introduction**

1 The frequency band 2.9 – 3.1 GHz has been an important band for maritime radars for well over 40 years. This allocation together with that in the 9 GHz band form the essential global frequency requirement for maritime radars that are required by IMO SOLAS Chapter V.

2 These primary frequency allocations have been generally assumed by IMO to be available in perpetuity, on an exclusive basis with other radiodetermination services. This is not, in fact, correct and ITU is now starting to investigate the possibility of sharing these bands with other services.

3 Advances in technology over the last decade have now made available new global mobile radio services that will require additional radio spectrum allocations for their future expansion.

#### **Current situation within ITU-R**

4 Studies are currently being progressed in both the ITU and regionally to determine the possibility of sharing frequency bands between radiodetermination services and other mobile radio services, particularly in the band 2.7 – 2.9 GHz. This involves another safety service i.e., air traffic control radars.

5 The regional studies taking place in Europe, the outcome of which will be sent to ITU, include the following:

- .1 study of the possibility of sharing in the band 2.7 – 2.9 GHz; and if this is shown to be not possible;
- .2 the possibility of moving the aeronautical radionavigation and meteorological radars from the band 2.7 – 2.9 GHz into the band 2.9 – 3.1 GHz (together possibly with the radiolocation services) i.e. sharing with the radiodetermination services that already occupy that band; and
- .3 study of the use of the band 2.9 – 3.4 GHz – again with the possibility of sharing by other services.

6 In addition there is a separate proposal within ITU to upgrade the current secondary allocation for radiolocation in the band 2.9 - 3.1 GHz to a co-primary allocation with maritime radionavigation.

7 All of the above impact on the current use of the band 2.9 – 3.1 GHz by the maritime radionavigation service and will increase the difficulties of correct operational functioning of a safety service.

8 New spurious emission limits for radar were specified in Appendix S3 of the Radio Regulations after WRC-1997 and were clarified in WRC-2000. These limits apply to all new radars from 1 January 2003 and to all existing radars from 1 January 2012.

9 In parallel with the above, ITU in Task Group 1-5 developed limits for radar out-of-band emissions and their boundary with radar spurious emission limits. These out-of-band emission limits have been confirmed by ITU-R WP 8B, and finally adopted by ITU SG1, as a new recommendation on out-of-band emissions.

10 It should be noted that this introduces limits for out-of-band emissions for all radiocommunication services (including safety services) on a world-wide basis for the first time. It therefore creates significant technological problems for the radar industry. Although it is anticipated that such limits for out-of-band emissions will not become part of the Radio Regulations, there is an agenda item 1.8.1 for WRC-2003 which may cause a revision of Appendix S3 to specify the boundary between out-of-band and spurious emissions.

11 Stricter limits may be required in the future to take account of some reported instances of interference by current maritime radars into other services and the desire by some Administrations to create the conditions for sharing in the current exclusive radiodetermination frequency bands.

### **The impact on the future safety requirements for IMO**

12 There are further future proposals for more stringent restrictions on the maximum permitted out-of-band emission limits and boundary conditions for radar systems. If these are realized, the impact on the maritime radar community will be far reaching. Few current maritime radars will meet these proposals. Technological solutions are not easily implemented and it is likely to take many years before solutions can be found.

13 The range of possible technical solutions is limited by the continuing need for maritime radars to be capable of triggering and receiving the responses from radar beacons and SARTs. These requirements should be re-examined.

14 The future of radar as an important component of maritime safety (SOLAS) will need to be re-examined. The future difficulties for the maritime radar industry and the use of their products for maritime safety cannot be over-emphasized. These difficulties are likely to become worse as the demands for more spectrum by other services increases. IMO should consider developing a Formal Safety Assessment for their radionavigation services, on similar lines to those already in existence for aeronautical services. The radar industry needs time to develop new solutions and should not be forced into interim costly solutions in order to satisfy the requirements of 'non-safety' radio services for more frequency spectrum.

### **Summary**

15 Currently there are very real threats to the frequency allocations for maritime radars. To counter these, the following must be taken into account:

- .1 that manufacturers will need considerable time to develop solutions to the envisaged ITU requirements for unwanted emissions;

- .2 that the impact on the operation of the maritime safety radionavigation service will need to be carefully examined; should further sharing be envisaged by other non-radar services, in particular the mobile services, in both the on-board and harbour entrance/port environments;
- .3 that consideration should be given to the review of their requirements for radars, in the light of their current performance requirements contained in the relevant IMO resolutions and SOLAS regulations, including those for radar beacons and SARTs. Serious consideration should be given to the development of a Formal Safety Assessment case to protect maritime radars from unacceptable interference in all maritime operational environments;
- .4 that in liaison with the ITU, there should be extreme caution over the imposition of unwanted emission limits on a safety service, within an unrealistic time scale; and
- .5 that in liaison with ITU, there should be extreme caution with regard to the sharing of exclusive radiodetermination bands, in which safety services operate, with other services.

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**ANNEX 6**

**DRAFT RESOLUTION MSC....(74)  
(adopted on .. June 2001)**

**ADOPTION OF AMENDMENTS TO RESOLUTION A.810(19) - PERFORMANCE  
STANDARDS FOR FLOAT-FREE SATELLITE EMERGENCY  
POSITION-INDICATING RADIO BEACONS (EPIRBs)  
OPERATING ON 406 MHz**

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING ALSO resolution A.886(21), by which the Assembly resolved that the functions of adopting performance standards for radio and navigational equipment, as well as amendments thereto, shall be performed by the Maritime Safety Committee on behalf of the Organization,

HAVING CONSIDERED resolution A.810(19) on Performance Standards for Float-Free Satellite Emergency Position-Indicating Radio Beacons (EPIRBs) Operating on 406 MHz, as amended by resolution MSC.56(66), and reviewed the requirements to satellite signals, part B of the Annex to resolution A.810(19),

ADOPTS the Amendments to the Recommendation on performance standards for float-free satellite emergency position-indicating radio beacons (EPIRBs) operating on 406 MHz, annexed to resolution A.810(19), set out in the Annex to the present resolution.

ANNEX

**AMENDMENTS TO THE RECOMMENDATION ON PERFORMANCE  
STANDARDS FOR FLOAT-FREE SATELLITE EMERGENCY  
POSITION-INDICATING RADIO BEACONS (EPIRBs)  
OPERATING ON 406 MHz (RESOLUTION A.810(19))**

**ANNEX TO RESOLUTION A.810(19)**

**Part B**

*Satellite signals*

- 1 Paragraph 1 is deleted.
- 2 Paragraph 2 is renumbered as paragraph 1.
- 3 In the sentence of paragraph 1, as renumbered,:
  - .1 the words “Recommendation ITU-R M.633” are deleted; and
  - .2 after the word “with” the words “the requirements of the COSPAS-SARSAT System document C/S T.001” are included.
- 4 The rest of paragraphs are renumbered.

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**ANNEX 7**

**PROPOSED DRAFT AMENDMENT TO SOLAS CHAPTER V TO MAKE THE  
CARRIAGE OF VOLUME III OF THE IAMSAR MANUAL ON BOARD  
SHIPS MANDATORY**

**Regulation 21**

1 Change the title of regulation V/21 to read:

**“International Code of Signals and IAMSAR Manual”.**

2 Insert new paragraph 2 as follows:

“2 All ships shall carry an up-to-date copy of Volume III of the International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual.”

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**ANNEX 8****DRAFT MSC CIRCULAR ON ADOPTION OF AMENDMENTS TO THE  
INTERNATIONAL AERONAUTICAL AND MARITIME SEARCH  
AND RESCUE (IAMSAR) MANUAL**

1 The Maritime Safety Committee, at its [seventy-fourth session, 30 May to 8 June 2001,] having been informed that the International Civil Aviation Organization on [.....] approved the amendments to the IAMSAR Manual, as prepared by the ICAO/IMO Joint Working Group on Harmonization of Aeronautical and Maritime Search and Rescue and endorsed by the COMSAR Sub-Committee at its fifth session, 11 to 15 December 2000, and set out at the annex, adopted the annexed amendments in accordance with the amending procedure as laid down in resolution A.894(21).

2 The Maritime Safety Committee decided that the amendments should enter into force on [...] July 2002.

## ANNEX

### Summary of Amendments to IAMSAR Manual Search Planning Procedures

The major changes being proposed involve the methods for estimating the drift and determining the optimal search area for search objects in the marine environment. Specifically, methods for dealing with search objects that tend to have leeway vectors diverging from the down wind direction to the right or left, have been added. An improved method for estimating the total probable drift error has been developed. Methods for optimally allocating effort to leeway divergence datums have also been added. New leeway data is proposed in the form of new graphs for leeway speed and values for leeway divergence angles and probable errors in leeway estimates. New sweep width tables and correction factors for aircraft searches are proposed to correct certain anomalies that have been observed when using the present values. Appendices K, L and N have the greatest volume of changes.

In addition to the changes just mentioned, a number of corrections are proposed. Most require only minor editing and many can be done with pen and ink if the cost of publishing corrected pages is considered prohibitive. However, most of these changes are also quite important if the reader is to gain a correct understanding of the material. The few remaining changes are generally minor grammatical corrections.

- 1 Several acronyms and terms associated with the proposed new methods are proposed for inclusion in the Abbreviations and Acronyms and Glossary sections.
- 2 A minimal number of changes are proposed for Chapter 4 to make the text and figures there consistent with the proposed new methods.
- 3 The **Datum Worksheet** and the worksheets supporting it have been modified to accommodate leeway divergence and the new method for estimating total probable drift error. A **Leeway Worksheet** was added. Appropriate modifications to all worksheet instructions are included.
- 4 The present **Effort Allocation Worksheet for Optimal Search Around a Datum Point or Datum Line** was divided approximately in half to form two separate worksheets – a **Total Available Search Effort Worksheet** and a new **Effort Allocation Worksheet for Optimal Search of Single Point, Leeway Divergence, and Line Datums**. Between these two worksheets is a **Widely Diverging Datums Worksheet**. Use of this worksheet is needed only when the divergence distance between leeway divergence datums is large in comparison to the total probable error of position – a situation that is expected to be relatively rare in practice. The new **Effort Allocation Worksheet for Optimal Search of Single Point, Leeway Divergence, and Line Datums** and corresponding instructions contain procedures for optimally allocating effort in situations involving leeway divergence as well as for single point and line datums. Procedures for extending line datums to account for probable position error around one or both end points and procedures for optimally allocating effort in these cases were added. The **Total Available Search Effort Worksheet** is consistent with the proposed replacement sweep width tables and correction factors.

- 5 Minor changes to other worksheets needed for correct referencing of the above worksheets are proposed. Some unrelated minor corrections are also proposed.
- 6 New leeway graphs and data based on the latest available experimental data and analyses are proposed as replacements for the present **Figures N-2** and **N-3**.
- 7 New tables of sweep widths for helicopters and fixed wing aircraft are proposed. These are based on the latest sweep width experiments and data analysis. The proposed replacements for **Tables N-5** and **N-6** have meteorological visibility as an entering argument, making them more consistent with the other two sweep width tables. New weather correction factors (**Table N-7**) are proposed that is also based on the latest sweep width experiments. Since the need for a visibility correction factor has been eliminated, it is proposed that **Table N-8** be replaced with a table of correction factors for search facility speed (velocity) that was also an outcome of the latest sweep width experiments and data analysis.

ANNEX

AMENDMENTS TO THE IAMSAR MANUAL<sup>1</sup>

VOLUME I

In page 2-9, paragraph 2.7.2 last line after "... organizations" **add:**  
", including support for specialized functions such as developing a search plan"; and  
after "other sources of data." **add:**  
"Additional information may be found in paragraph 1.11 of Volume II, *Mission Co-ordination*."

VOLUME II

Abbreviations and Acronyms

Page	Amendment
ix	<b>Add:</b> "ASW .....average surface wind" <b>Add:</b> "ASW <sub>e</sub> ..... average surface wind error" <b>Add:</b> "ASWDV <sub>e</sub> ..... drift velocity error due to ASW <sub>e</sub> " <b>Add:</b> "DD .....(leeway) divergence distance"
x	<b>Add:</b> "DV <sub>e</sub> .....total drift velocity error" <b>Add:</b> "f <sub>v</sub> ..... search facility velocity correction factor"
xi	<b>Add:</b> "L <sub>b</sub> ..... datum base line" <b>Add:</b> "LW <sub>e</sub> ..... leeway error"
xii	<b>Add:</b> "SC <sub>e</sub> ..... sea current error"
xiii	<b>Add:</b> "SR .....separation ratio" <b>Add:</b> "TC <sub>e</sub> ..... tidal current error" <b>Add:</b> "TWC <sub>e</sub> ..... total water current error"
xiv	<b>Add:</b> "WC <sub>e</sub> ..... wind current error" <b>Add:</b> "Z <sub>a</sub> ..... available effort" <b>Add:</b> "Z <sub>t</sub> .....relative effort" <b>Add:</b> "Z <sub>tc</sub> ..... cumulative relative effort" <b>From</b> "Z <sub>t</sub> " to "Z <sub>t</sub> , Z <sub>ta</sub> "

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<sup>1</sup> Contents and index for each volume should be checked and renumbered, if necessary.

## Glossary

Page	Item	Amendment
xv	<b>“Available effort (<math>Z_a</math>)</b>	<b>Add:</b> The amount of effort available for assignment to a particular datum”
xvi	<b>“Datum base line</b>	<b>Add:</b> That portion of a datum line that is drawn between two specific locations, such as way points on a distressed or missing craft’s intended track line. May be extended to form a datum line that accounts for the probable error(s) of one or both locations.
xvi	<b>Datum marker buoy (DMB)</b>	<b>From</b> “actual sea current” <b>to</b> “actual total water current”
	<b>“Divergence Distance</b>	<b>Add:</b> Distance between the left and right leeway divergence datums.”
	<b>Drift error (<math>D_e</math>)</b>	<b>From</b> “ <i>Total drift error</i> ” <b>to</b> “ <i>Total probable drift error</i> ”
	<b>Effort factor (<math>f_z</math>)</b>	<b>From</b> “(1) For point datums” <b>to</b> “(1) For point and leeway divergence datums”
xvii	<b>Initial position error (<math>X</math>)</b>	<b>Replace</b> definition with:  “The estimated probable error of the initial position(s) at the beginning of a drift interval. For the first drift interval, this will be the probable error of the initially reported or estimated position of the SAR incident. For subsequent drift intervals, it will be the total probable error of the previous datum position(s).”
xviii	<b>“Leeway Divergence Angle</b>	<b>Add:</b> The average angle between an object’s direction of leeway and the down wind direction. Leeway may diverge to either the right or the left of the down wind direction. Current evidence indicates that object’s with significant leeway divergence angles rarely jibe or tack down wind.”
xviii	<b>“Leeway error (<math>LW_e</math>)</b>	<b>Add:</b> ..... The probable error of the leeway estimate.”
xx	<b>“Sea current error (<math>SC_e</math>)</b>	<b>Add:</b> The probable error of the sea current estimate.”
xxii	<b>“Separation Ratio (<math>SR</math>)</b>	<b>Add:</b> The ratio of the divergence distance ( $DD$ ) between two leeway divergence datums to the total probable error of position ( $E$ ). ( $SR = DD/E$ )”

Page	Item	Amendment
xxiii	<b>“Tidal current (TC) Tidal current error (TC<sub>e</sub>) Total drift error (D<sub>e</sub>)</b>	<b>Add:</b> Near-shore currents caused by the rise and fall of the tides. The probable error of the tidal current estimate.” <b>Replace</b> definition with: “Also total probable drift error. The total probable error in the datum position that is contributed by the total drift velocity error (DV <sub>e</sub> ). $D_e = DV_e \times t$ where $t$ is the length of the drift interval in hours.”
xxiii	<b>“Total drift velocity error (DV<sub>e</sub>)</b>	<b>Add:</b> Also total probable drift velocity error. The total probable error of the total drift velocity based on the probable errors contributed by the probable errors in the average surface wind, leeway, and total water current.”
xxiii	<b>“Total water current error (TWC<sub>e</sub>)</b>	<b>Add:</b> Also total probable water current error. The total probable error of the total water current based on either (a) the probable error of the measured total water current or (b) the probable errors of the wind current, tidal or sea current, and any other current that contributed to the total water current.”
	<b>“Wind current error (WC<sub>e</sub>)</b>	<b>Add:</b> The probable error of the wind current estimate.”

## Chapter 1

Page 1-15, paragraph 1.11.1 **add** at the end of the paragraph:

“This is not true for software that directly addresses the search planning problem. Developing such software requires specialized expertise in computer modelling, the application of search theory and the application of environmental sciences such as meteorology and oceanography to SAR. Paragraph 1.11.9 lists some of the functional characteristics that should be considered for search planning software.”

Page 1-16, **add** new paragraph:

“1.11.9 *Computer-based Search Planning*. The use of computers to support the search planning process is growing as it offers the SAR Co-ordinator greater flexibility to calculate a refined search area. Although there may be a tendency to computerise the manual method, computerising this overly simplified pencil-and-paper technique should be avoided. Computers make much more sophisticated techniques feasible, such as making the best use of increasingly available detailed environmental data for modelling and predicting drift, creating and testing various scenarios, integrating and evaluating the impact of late-arriving information, and simulating changes in the search object’s status and type, etc. Perhaps most importantly, such models can produce optimal search plans that maximise the probability of success. SAR Co-ordinators are cautioned that they should be familiar with the basic theories of each Search Planning element to fully take advantage of the search planning software. SAR Co-ordinators are also reminded that computers are only devices that provide support; they cannot make important decisions and the quality of their outputs can only be as good as the quality of the inputs. Further information may be found in Appendix P of this publication.”

## Chapter 4

Page	Section	Line	Amendment
4-1		Footnote	<b>From</b> “a geographic point, line or area” <b>to</b> “a geographic point (or set of points), line or area”
4-2	4.2.2	1-2	<b>From</b> “The many diverse criteria ... makes ...” <b>to</b> “The many diverse criteria ... make ...”
4-3	4.3.2	1	<b>From</b> “A datum may be a point, line or area.” <b>to</b> “A datum may be a point (or set of points), line or area.”
	4.3.3	4	<b>From</b> “geometric figure covering” <b>to</b> “geometric figure or figures covering”

Page	Section	Line	Amendment
4-6	4.4.3(a)4		<b>From</b> “be somewhat off the downwind direction” <b>to</b> “diverge to the left or the right of the downwind direction. (The average angle between the search object’s leeway direction and the downwind direction is known as the leeway divergence angle.) Whether the craft’s leeway will diverge to the left or the right is unknown. This uncertainty requires that both possibilities be considered.”
4-6	4.4.3(a)7		<b>From</b> “Leeway rates may be computed” <b>to</b> “Leeway rates and leeway directions may be computed”
		8	<b>From</b> “procedures provided with the Datum Worksheet” <b>to</b> “procedures provided with the Leeway Worksheet”
4-7	4.4.4	13	<b>From</b> “ <i>Only those designed to move with the upper one or two metres of the ocean are useful for search planning purposes.</i> ” <b>to</b> “ <i>Those that move with the upper one or two metres of the ocean measure total water current while those that are designed to move with deeper currents tend to measure only sea current.</i> ”
4-8	4.4.6	1	<b>From</b> “the direction and rate of drift” <b>to</b> “the directions and rates of drift”
4-8	Figure 4-7		<b>Replace</b> Figure 4 -7 with the one shown below.

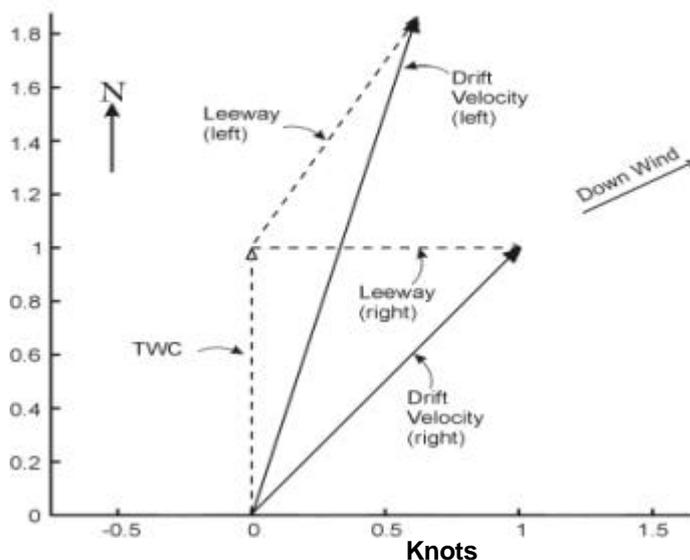


Figure 4-7 – Computing drift speeds and directions from total water current and leeway

Page	Section	Line	Amendment
4-9	4.4.7(a)1		<b>From</b> “Point Datums” to “Single Point and Leeway Divergence Datums”
4-9	4.4.7(a)3		<b>Add:</b> “In a drift involving leeway, the first drift interval will produce two new datum points, one for each of the leeway vectors. Thereafter, it is assumed that the “left” datum will always use the leeway vector that is to the left of the down wind direction and the “right” datum will always use the leeway vector that is to the right of the down wind direction.”

4-9 Figure 4-8 **Replace** Figure 4-8 with the one shown below.

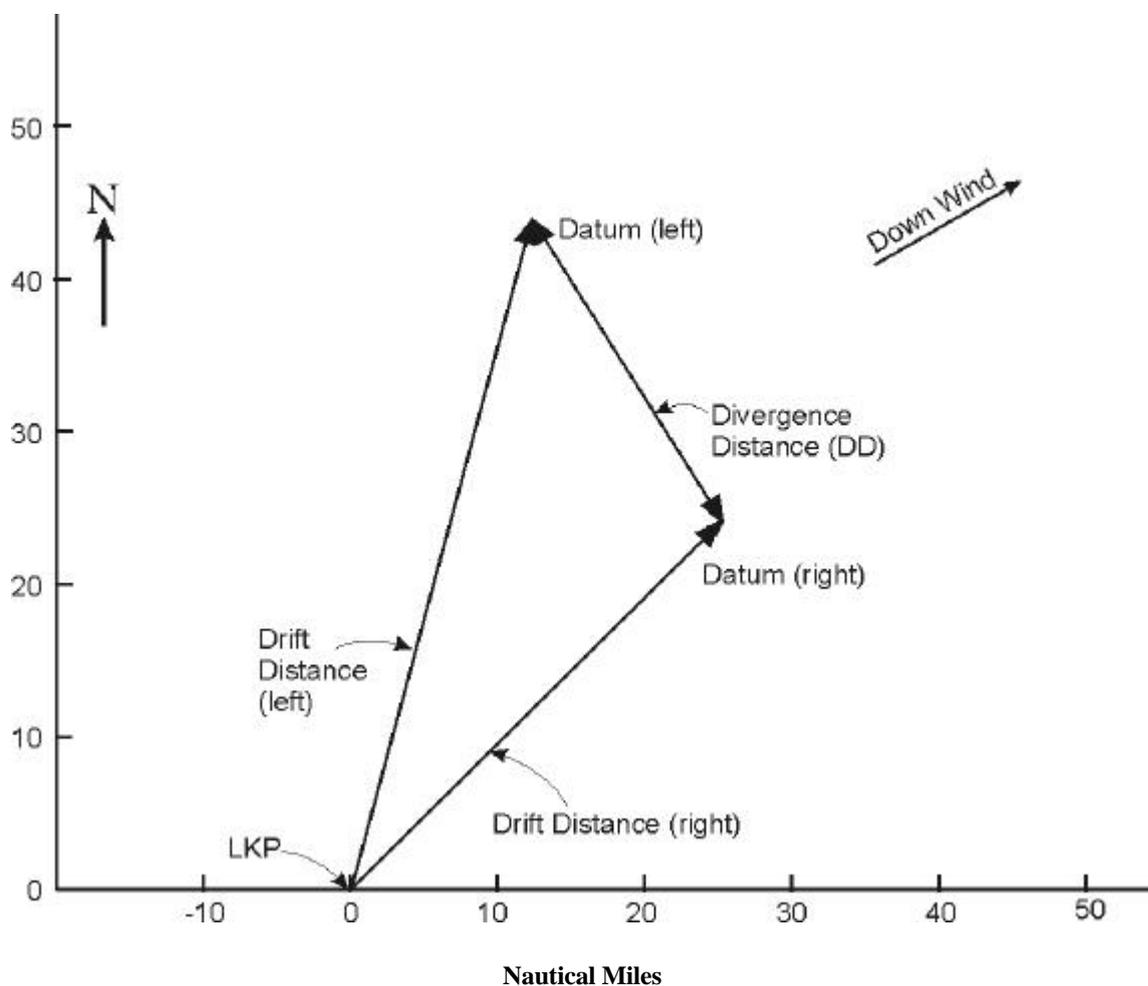


Figure 4-8 – Determining new datums and divergence distance  
(drift distance = drift speed × time adrift)

4-10	4.4.8	1	<b>From</b> “the computed drift velocity and the resulting drift distance” to “the computed drift velocities and the resulting drift distances”
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Page	Section	Line	Amendment
4-10	4.4.8(a)	1	<b>From</b> “a few types of craft” <b>to</b> “many types of craft”
		2	<b>From</b> “Furthermore, most leeway studies have data only for light to moderate wind speeds. Estimates for higher” <b>to</b> “Furthermore, few leeway studies have data for high wind speeds. Therefore, estimates for high”
		5	<b>From</b> “Some craft show a tendency to drift considerably off” <b>to</b> “Most craft show a tendency to have leeway off”
4-10	4.4.8(c)	all	<b>Replace</b> this entire paragraph with the following:  “The combined effects of the uncertainties in both environmental data and drift characteristics of the search object are taken into account by calculating the probable drift error rate (total probable drift velocity error) in knots. Multiplying the length of the drift interval in hours by this value gives the total probable drift position error ( $D_e$ ). If uncertainty values are unavailable, a probable error rate of 0.3 knots is usually assumed for each component of the drift velocity. The greater the uncertainty about the object’s drift characteristics or the winds and currents driving it, the greater the probable drift error rate estimate will be.”
4-11	4.6.1	<i>Effort Factor (<math>f_z</math>)</i>	<b>From</b> “(1) For point datums” <b>to</b> “For single point and leeway divergence datums”
		3	<b>From</b> “length of the line ( $L$ )” <b>to</b> “length of the datum line ( $L$ )”
		<i>Optimal Search Factor (<math>f_s</math>) – 3</i>	<b>From</b> “rectangle (line datums)” <b>to</b> “rectangle (leeway divergence and line datums)”
4-17	4.6.9(b)	2	<b>From</b> “line ( $L$ )” <b>to</b> “datum line ( $L$ )”
4-18	4.6.11	<i>Note – 1</i>	<b>From</b> “around datum points or along datum lines” <b>to</b> “for single point, leeway divergence and line datums”
4-18	4.6.12	last	<b>From</b> “(for line datums)” <b>to</b> “(for leeway divergence and line datums)”

Page	Section	Line	Proposed Change
4-19	4.6.14(b)	2	<b>From</b> “is as large, or larger than” <b>to</b> “is as large as, or larger than”
4-21	4.6.17	3	<b>From</b> “then the total POC for the two searches would be 75%” <b>to</b> “then the total POS for the two searches would be 75%”
		Equation	<b>From</b> “+ ... + POC <sub>n</sub> ” <b>to</b> “+ ... + POS <sub>n</sub> ”
4-23	4.7.4(b)(2)	last	<b>From</b> “search is about 82%” <b>to</b> “search is about 87%”

Page	Section	Line	Proposed Change
4-23	4.7.4(c)	5	<b>Add:</b> “Probability maps are very useful when searching for stationary search objects even when the map probabilities must be updated by hand. Their use is always highly recommended for this type of search. However, when searching for moving objects, such as a boat or raft adrift on the ocean, maintaining probability maps by hand can prove to be very difficult. Updating of probability maps to account for <b>both</b> unsuccessful prior searching <b>and</b> increasingly uncertain search object drift is such a complex task that it is better left to computers programmed for the purpose.”
4-24	4.7.5(b)(2)	8	<b>From</b> “the optimal search factor ... is 1.4” <b>to</b> “the optimal search factor ... is 1.5”
		3 <sup>rd</sup> equation	<b>From</b> “= 1.4 × 10 = 14 NM” <b>to</b> “= 1.5 × 10 = 15 NM”
		4 <sup>th</sup> equation	<b>From</b> “= 2 × 14 × 100 = 2800 NM <sup>2</sup> ” <b>to</b> “= 2 × 15 × 100 = 3000 NM <sup>2</sup> ”
		next line	<b>From</b> “which is a 28 NM” <b>to</b> “which is a 30 NM”
		5 <sup>th</sup> equation	<b>From</b> “4000/2800 = 1.4” <b>to</b> “4000/3000 = 1.33”
		next line	<b>From</b> “the POD for this search is about 92%” <b>to</b> “the POD for this search is about 74%”
4-26	4.7.6(d)	last sentence	<b>From</b> “a sweep width of 5.0 nautical miles” <b>to</b> “a sweep width of 2.0 nautical miles”
	4.7.6(e)(1)	2	<b>From</b> “150 × 4 × 5 = 1200” <b>to</b> “150 × 4 × 2 = 1200”
4-27	4.7.6(e)(2)	5	<b>From</b> “POS of 2/3 × 0.25” <b>to</b> “a POC of 2/3 × 0.25”
4-29	4.7.6(e)(3)	5	<b>From</b> “would be 0.8 × 0.47 or 38.6%” <b>to</b> “would be 0.8 × 0.47 or 37.6%”
	Figure 4-18	Trial 2	<b>From</b> “POS = 38.6%” <b>to</b> “POS = 37.6%”
4-30	4.7.6(h)(2)	3	<b>From</b> “producing a POS of 23.40%” <b>to</b> “producing a POS of 23.70%”
4-33	4.7.8	6	<b>From</b> “necessary, but sometimes difficult, task. The first step” <b>to</b> “necessary, but often difficult, task if probability maps are to be used effectively in this situation. The generation and maintenance of probability maps for searches involving moving objects is best left to computers programmed for the purpose. To manually update a probability map for a drifting object, the first step”

### Appendix K – Determining Datum

Page	Item	Line	Amendment
K-i			<b>Modify</b> table of contents as needed to reflect changes outlined below.
K-2	K.2.5	2	<b>From</b> “paragraph K.1.2.3(a)” <b>to</b> “paragraph K.2.2(a)”
K-6	B.4	2	<b>From</b> “Table N-14” <b>to</b> “Table N-13”
	B.8	1	<b>From</b> “ $(d_g = TAS_g \times t_d)$ ” <b>to</b> “ $(d_g = (TAS_g \times t_d)/60)$ ”
K-8	B.8	1	<b>From</b> “time of descent <b>(B.7)</b> ” <b>to</b> “time of descent <b>(B.7)</b> and divide the result by 60 to get the glide distance in nautical miles”
K-9	B.14	6	<b>From</b> “enter the sum of” <b>to</b> “enter the larger of”
K-11	2	title	<b>From</b> “Computing the Total Hours” <b>to</b> “Computing the Total Altitude Loss”
	4	3	<b>From</b> “in the drift interval” <b>to</b> “in the altitude loss”
	5	1	<b>From</b> “Go to <b>B.5</b> ” <b>to</b> “Go to <b>line B.10</b> ”
K-13 to K-25			<b>Replace</b> all pages with the <b>attached Datum Worksheet, Datum Worksheet Instructions</b> , and supporting worksheets and instructions (attached pages K-13 to K-39).

## Appendix L – Search Planning and Evaluation

Page	Item	Line	Amendment
L-i			<b>Modify</b> table of contents as needed to reflect changes outlined below.
L-1 to L-4			<b>Replace</b> these pages with the attached worksheets and instructions (attached pages L-1 to L-24).
L-17	13	4	<b>Insert</b> the following sentence after “probability map.”:  “Complete the new probability map by copying the POC values for the remaining (un-searched) cells from the previous probability map.”
L-18	14	“Total POC ...”	<b>Replace</b> instructions with the following:  “Add the POC values from all cells on the new probability map to get the total probability of containment remaining after the latest search.”
L-5 to L-18			<b>Re-number</b> pages as needed (L-25 to L-38 if format of attached pages L-1 to L-24 is preserved).

**Appendix M – Preparing Initial Probability Maps**

<b>Page</b>	<b>Item</b>	<b>Line</b>	<b>Amendment</b>
M-1	Title	2	<b>From “For Point Datums” to “For Single Point Datums”</b>
	2	2	<b>From “line 25” to “line 14.b”</b>
M-2	Title	2	<b>From “For Point Datums Instructions” to “For Single Point Datums Instructions”</b>
	2	1	<b>From “line 25” to “line 14.b”</b>
M-4	2	2	<b>From “line 25” to “line 14.b”</b>
M-5	2	1	<b>From “line 25” to “line 14.b”</b>

## Appendix N – Tables and Graphs

Page	Item	Line	Amendment
N-2	Figure N-2		<b>Replace</b> with attached Figure N-2 for “Life Rafts, Survival Craft and Persons in the Water.”
N-3	Figure N-3		<b>Replace</b> with attached Figure N-3 for “Power Vessels, Sailing Vessels and Person-powered Craft.”
N-4		2	<b>From</b> “of the distressed craft and the of the search facilities” <b>to</b> “of the distressed craft and of the search facilities” <i>i.e.</i> , delete the extra “the”.
N-6	Table N-5		<b>Replace</b> with attached “Table N-5 Sweep widths for helicopters (km (NM)).”
N-7	Table N-6		<b>Replace</b> with attached “Table N-6 Sweep widths for fixed-wing aircraft (km (NM)).”
	Table N-7		<b>Replace</b> with attached “Table N-7 Weather correction factors for all types of search facilities.”
	Table N-8		<b>Replace</b> with attached “Table N-8 Speed (velocity) correction factors for helicopter and fixed-wing aircraft search facilities.”
N-9	Table N-12	4000	In the second column under <b>Distance in nautical miles</b> , change value from “ <b>47</b> ” to “ <b>74</b> ”
N-7 to N-20			<b>Re-number</b> pages as needed to accommodate the larger sweep width tables.

**New Pages to Appendix K**  
**Datum Worksheet**  
**For Computing Drift in the Marine Environment**

Case Title: \_\_\_\_\_ Case Number: \_\_\_\_\_ Date: \_\_\_\_\_

Planner's Name: \_\_\_\_\_ Datum Number: \_\_\_\_\_ Search Plan: A B C \_\_\_\_\_

Search Object: \_\_\_\_\_

**A. Starting Position for this Drift Interval**

- |                                     |  |                  |
|-------------------------------------|--|------------------|
| 1. Type of Position<br>(Circle one) | Last Known Position<br>Estimated Incident Position<br>Previous Datum | LKP<br>EIP<br>PD |
| 2. Position Date/Time               | _____Z_____  |                  |
| 3. Latitude, Longitude of Position  | ____N/S      ____W/E   |                  |

**B. Datum Time**

- |                              |             |
|------------------------------|-------------|
| 1. Commence Search Date/Time | _____Z_____ |
| 2. Drift Interval            | ____Hours   |

**C. Average Surface Wind (ASW)**  
(Attach **Average Surface Wind (ASW) Worksheet**)

- |  |                     |
|--|---------------------|
| 1. Average Surface Wind (ASW)  | ____°T      ____KTS |
| 2. Probable Error of Drift Velocity due to<br>Probable Error of Average Surface Wind (ASWDV <sub>e</sub> ) | ____KTS             |

**D. Total Water Current (TWC)**  
(Attach **Total Water Current (TWC) Worksheet**)

- |   |                     |
|---|---------------------|
| 1. Total Water Current (TWC)                              | ____°T      ____KTS |
| 2. Probable Total Water Current Error (TWC <sub>e</sub> ) | ____KTS             |

**E. Leeway (*LW*)**

(Attach **Leeway (*LW*) Worksheet**)

1. Left of down wind \_\_\_\_\_ °T \_\_\_\_\_ KTS
2. Right of down wind \_\_\_\_\_ °T \_\_\_\_\_ KTS
3. Probable Leeway Error (*LW<sub>e</sub>*) \_\_\_\_\_ KTS

**F. Total Surface Drift**

Use a Manoeuvring Board or Calculator to add Total Water Current and Leeway vectors.  
 (See **Figure K-1a.**)

- |  |                     |                      |
|--|---------------------|----------------------|
|  | (left of down wind) | (right of down wind) |
| 1. Drift Directions  | _____ °T            | _____ °T             |
| 2. Drift Speeds  | _____ KTS           | _____ KTS            |
| 3. Drift Distances ( <b>line F.2 × line B.2</b> )                | _____ NM            | _____ NM             |
| 4. Total Probable Drift Velocity Error ( <i>DV<sub>e</sub></i> ) | _____ KTS           |                      |
| $\left( DV_e = \sqrt{ASWDV_e^2 + TWC_e^2 + LW_e^2} \right)$      |                     |                      |

**G. Datum Positions and Divergence Distance**

Using a Chart, Universal Plotting Sheet or Calculator, determine the datum positions and divergence distance (*DD*) (See **Figure K-1b.**)

1. Latitude, Longitude (left of down wind) \_\_\_\_\_ N/S \_\_\_\_\_ W/E
2. Latitude, Longitude (right of down wind) \_\_\_\_\_ N/S \_\_\_\_\_ W/E
3. Divergence Distance (*DD*) \_\_\_\_\_ NM

**H. Total Probable Error of Position (*E*) and Separation Ratio (*SR*)**

(Attach **Total Probable Error of Position (*E*) Worksheet**)

1. Total Probable Error of Position Squared (*E<sup>2</sup>*) \_\_\_\_\_ NM<sup>2</sup>
2. Total Probable Error of Position (*E*) \_\_\_\_\_ NM
3. Separation Ratio (*SR = DD/E*) \_\_\_\_\_
4. Go to the **Total Available Search Effort Worksheet.**

## Datum Worksheet (Marine Environment) Instructions

**Introduction.** The **Datum Worksheet** is used to compile information from other worksheets and compute a new Datum Position. A **Datum Worksheet** should be completed for each initial datum point.

Complete the information at the top of the page, then go to **Part A**.

### A. Starting Position for this Drift Interval

1. Type of Position  
Circle the appropriate source of information about the starting position for this drift interval. If the initial position is the last known position (as clearly and accurately reported by the distressed vessel, an eyewitness, or a remote sensor), circle "LKP." If the initial position was estimated by dead reckoning or determined by remote sensing with a large probable error or as ambiguous positions (e.g. pairs of positions sometimes reported by COSPAS/SARSAT), circle "EIP." If the initial position for this drift interval was a datum position computed for a previous drift interval, circle "PD."
2. Position Date/Time  
Enter the date time group (DTG) of the starting position.  
Example: 231200Z FEB 99.
3. Latitude, Longitude of Position  
Enter the latitude and longitude of the starting position for this drift interval.

### B. Datum Time

1. Commence Search Date/Time  
Enter the date and time when the next search will begin in date time group (DTG) format. This will be the time for which the next datum position is computed.
2. Drift Interval  
Subtract the starting position date and time (**line A.2**) from the commence search date and time (**line B.1**). If necessary, convert the result from days and hours to get the number of hours between the two date time groups.

### C. Average Surface Wind (ASW)

If the search object has no leeway and wind current is not a factor, leave **Part C** blank and go to **Part D**. Otherwise, go to the **Average Surface Wind (ASW) Worksheet** and compute the average surface wind for this drift interval.

1. Average Surface Wind (*ASW*) Enter the average surface wind direction in degrees true and the average surface wind speed in knots from **line A.2** of the **Average Surface Wind (*ASW*) Worksheet**.
2. Probable Error of Drift Velocity due to  $ASW_e$  (*ASWDV<sub>e</sub>*) Enter the estimated probable error of the drift velocity that will be caused by the probable error of the average surface wind from **line B.2** of the **Average Surface Wind (*ASW*) Worksheet**.

**D. Total Water Current (*TWC*)**

1. Total Water Current (*TWC*) Enter the total water current direction in degrees true and the total water current speed in knots **from line A.2 or line B.5** of the **Total Water Current (*TWC*) Worksheet**, as appropriate.
2. Probable Total Water Current Error ( $TWC_e$ ) Enter the estimated/computed probable error of the total water current from **line A.3 or line B.6** of the **Total Water Current (*TWC*) Worksheet**, as appropriate.

**E. Leeway (*LW*)**

1. Left of down wind Enter the leeway direction to the left of the down wind direction in degrees true and the leeway speed in knots from **line 6.a** of the **Leeway (*LW*) Worksheet**.
2. Right of down wind Enter the leeway direction to the right of the down wind direction in degrees true and the leeway speed in knots from **line 6.b** of the **Leeway (*LW*) Worksheet**.
3. Probable Leeway Error ( $LW_e$ ) Enter the estimated probable leeway error from **line 7** of the **Leeway (*LW*) Worksheet**.

**F. Total Surface Drift**

The total surface drift velocities are the vector sum of the total water current velocity from **line D.1** and each of the leeway velocities from **lines E.1 and E.2**. Multiplying each of the total surface drift speeds by the drift interval produces the total surface drift distances.

1. Drift Directions Using a manoeuvring board or calculator, add the total water current vector from **line D.1** to each of the leeway vectors from **lines E.1 and E.2** to compute two resultant surface drift velocity vectors. **Figure K-1a** is an example of how the two drift velocity vectors might appear. Enter the direction of each resultant surface drift velocity vector.

2. Drift Speeds Enter the magnitude of each resultant surface drift velocity vector.
3. Drift Distances Multiply the drift speeds (**line F.2**) by the drift interval (**line B.2**) and enter the results.
4. Total Probable Drift Velocity Error ( $DV_e$ ) Compute the probable error of the surface drift velocity vectors by taking the square root of the sum of the squared errors from **lines C.2, D.2, and E.3**.

$$\left( DV_e = \sqrt{ASWDV_e^2 + TWC_e^2 + LW_e^2} \right)$$

### G. Datum Positions and Divergence Distance

Determine and plot the datum positions and determine the distance between them. (See **Figure K-1b**.)

1. Latitude, Longitude (left of down wind) Using a chart, universal plotting sheet, or a calculator, determine the latitude and longitude of the datum position based on the total drift direction (**line F.1**) and distance (**line F.3**) from the starting position (**line A.3**) for the datum that lies to the **left** of the down wind direction. Plot the position.
2. Latitude, Longitude (right of down wind) Using a chart, universal plotting sheet, or a calculator, determine the latitude and longitude of the datum position based on the total drift direction (**line F.1**) and distance (**line F.3**) from the starting position (**line A.3**) for the datum that lies to the **right** of the down wind direction. Plot the position.
3. Divergence Distance ( $DD$ ) Using a chart, universal plotting sheet, or a calculator, determine the divergence distance between the two datums. (See **Figure K-1b**.)

### H. Total Probable Error of Position ( $E$ ) and Separation Ratio ( $SR$ )

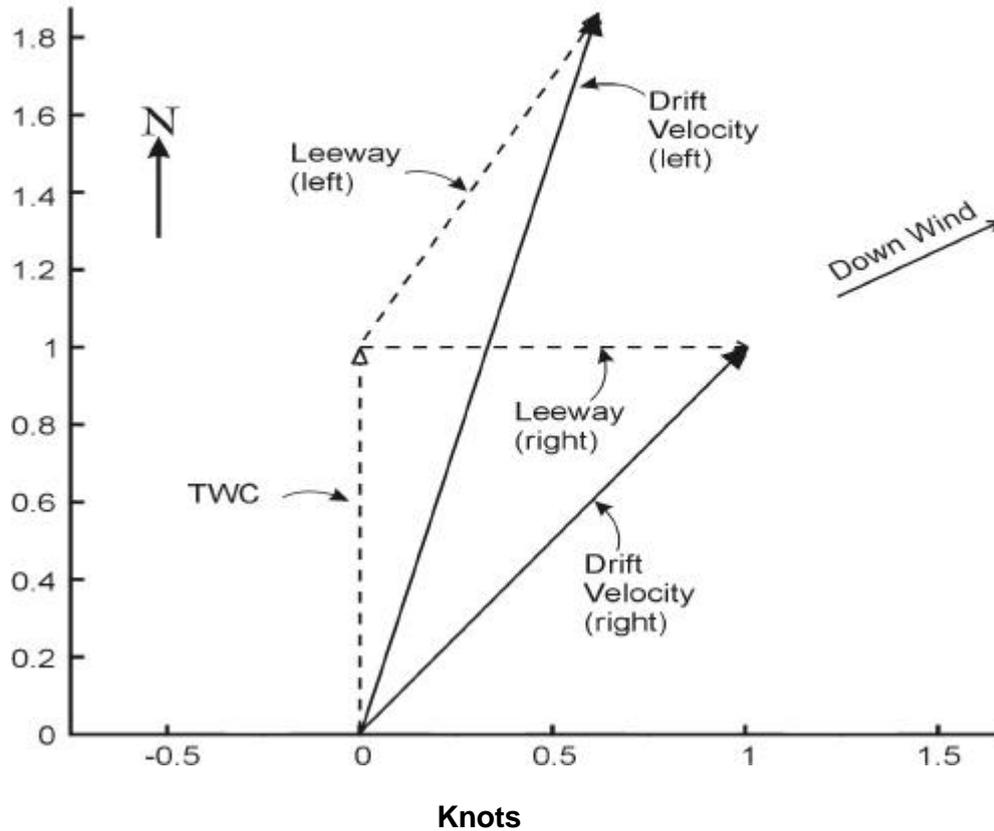
1. Total Probable Error of Position Squared ( $E^2$ ) Enter the square of the total probable error of position from **line D.1** of the **Total Probable Error of Position Worksheet**. This value will be used later with the **Effort Allocation Worksheet**.
2. Total Probable Error of Position ( $E$ ) Enter the total probable error of position from **line D.2** of the **Total Probable Error of Position Worksheet**. This value will also be used with the **Effort Allocation Worksheet**.

3. Separation Ratio (*SR*)

Divide the divergence distance (*DD*) on **line G.3** by the total probable error of position on **line H.2** and enter the result. Stated as a formula,  $SR = DD/E$ . This value will also be used with the **Effort Allocation Worksheet**.

4. Go to the **Total Available Search Effort Worksheet**

Proceed to the **Total Available Search Effort Worksheet** to continue planning the search.



**Figure K-1a.** – Drift Velocity Vectors With Leeway Divergence

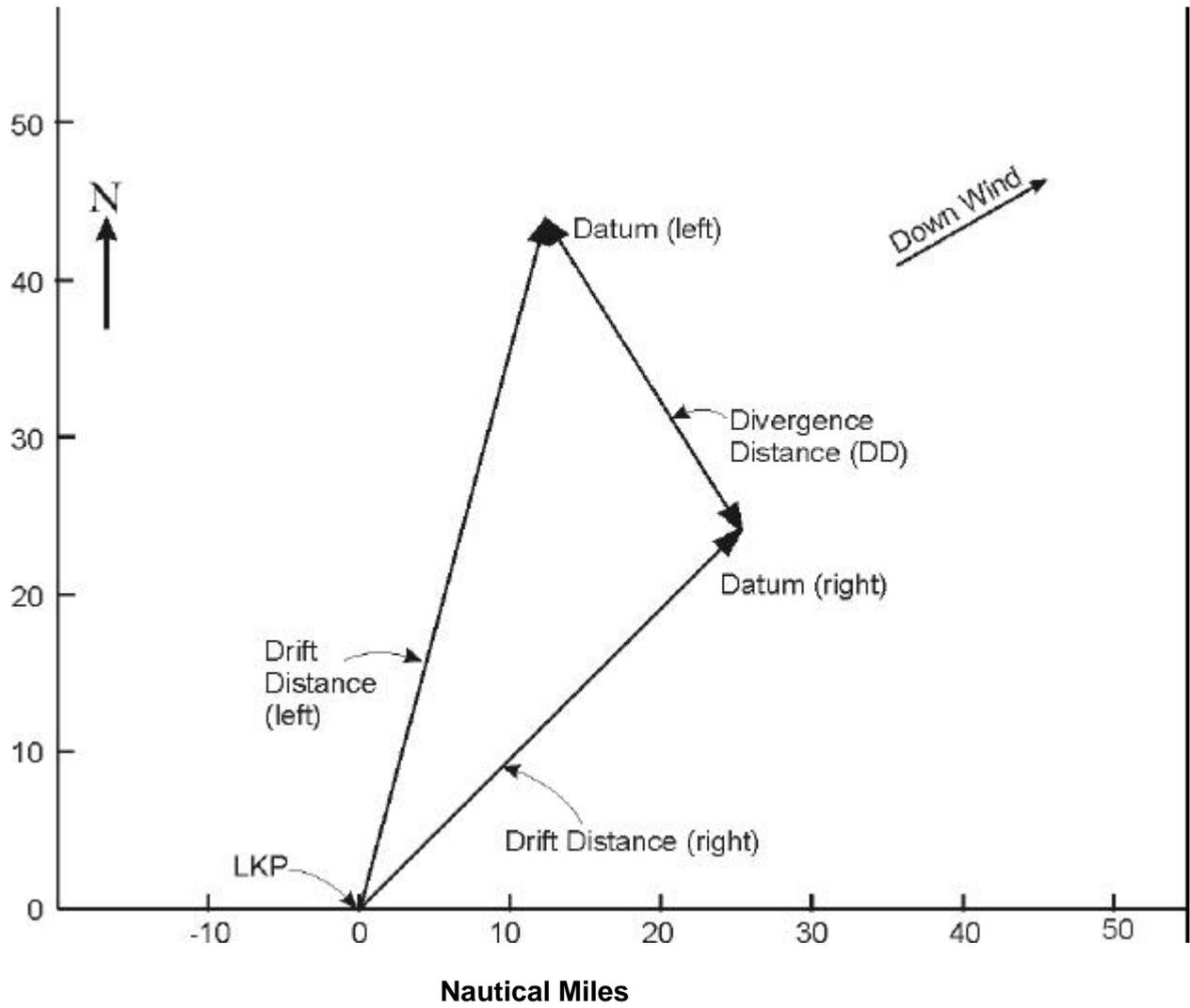


Figure K-1b – Drift Distances and Divergence Distance

**Average Surface Wind (ASW) Worksheet**

Case Title: \_\_\_\_\_ Case Number: \_\_\_\_\_ Date: \_\_\_\_\_

Planner's Name: \_\_\_\_\_ Datum Number: \_\_\_\_\_ Search Plan: A B C \_\_\_\_\_

**A. Average Surface Wind**

1. Surface Wind Data

Time of Observation	Time Interval	Number of Hours (A)	Wind Direction (B) (C)	Wind Speed (A × C) °T KTS	Wind Contribution NM
_____	_____ - _____	_____	_____ °T	_____ KTS	_____ NM
_____	_____ - _____	_____	_____ °T	_____ KTS	_____ NM
_____	_____ - _____	_____	_____ °T	_____ KTS	_____ NM
_____	_____ - _____	_____	_____ °T	_____ KTS	_____ NM
_____	_____ - _____	_____	_____ °T	_____ KTS	_____ NM
_____	_____ - _____	_____	_____ °T	_____ KTS	_____ NM
_____	_____ - _____	_____	_____ °T	_____ KTS	_____ NM
_____	_____ - _____	_____	_____ °T	_____ KTS	_____ NM
Total Hours		_____ (D)	Vector Sum of Contributions	_____ °T (E)	_____ NM (F)

2. Average Surface Wind (ASW) [(E)°T (F/D) KTS] \_\_\_\_\_ °T \_\_\_\_\_ KTS

**B. Probable Error**

1. Probable Error of the Average Surface Wind (ASW<sub>e</sub>) \_\_\_\_\_ KTS

2. Probable Error of Drift Velocity due to Probable Error of the Average Surface Wind (ASWDV<sub>e</sub>) \_\_\_\_\_ KTS

Go to **Part C** on the **Datum Worksheet**.

## Average Surface Wind (ASW) Worksheet Instructions

**Introduction.** The purpose of this worksheet is to compute a weighted average of wind velocity vectors over some period of time, usually a drift interval. Average surface wind is used to estimate wind current and leeway. The contribution of each wind observation or estimate is weighted according to the amount of time it was in effect. For example, a wind that has been in effect for twelve hours will have twice as much influence on the average wind as one that was in effect for only six hours. In general, wind averages should not be used for intervals exceeding 24 hours in length.

Wind observations and estimates are not exact and forecast wind data is even less accurate. Furthermore, the winds experienced by the search object can never be known precisely. Therefore, it is necessary to estimate the probable error of the average surface wind acting on the search object and the amount of probable error this will introduce into the drift computations. This amount will be used to compute the total probable error of position.

### A. Average Surface Wind (ASW)

#### 1. Surface Wind Data

For each available wind value in this drift interval, enter the time of the observation, the starting and ending times of the time interval during which that wind value was in effect, the number of hours in the interval (ending time minus starting time), the wind direction, the wind speed, and the wind contribution for that interval (wind speed times the number of hours in the interval).

#### 2. Average Surface Wind

Add the hours in the "Number of Hours" column to get the "Total Hours" (D). (The total hours should equal the number of hours in the drift interval from **line B.2** of the **Datum Worksheet**. If this is not the case, the difference should be explained.) Use a manoeuvring board or a calculator to compute the direction (E) and speed (F) of the vector sum of all the wind contribution vectors. Copy the direction of this vector sum (E) to the average surface wind direction on **line A.2** of this worksheet. Divide the speed of the vector sum (F) by the total hours (D) and enter the result as the average surface wind speed on **line A.2** of this worksheet. Copy the average surface wind direction and speed to **line C.1** of the **Datum Worksheet**.

## B. Probable Error

1. Probable Error of ASW  
Estimate the probable error of the average surface wind. If no value is available, enter 5 knots for observed winds, 8 knots for forecast winds.
2. Probable Error of Drift Velocity due to Probable Error of the Average Surface Wind ( $ASW_{DV_e}$ )  
Estimate the probable error of the drift velocity that will be caused by the probable error of the average surface wind. If no better estimate is available, enter **0.3** knots for observed winds that are either relatively steady or change gradually in speed or direction. Enter **0.5** knots for forecast winds and highly variable observed winds such as winds that suddenly shift during the passage of storms or weather fronts. Copy this value to **line C.2** of the **Datum Worksheet**. See note below for more information.

Note: The probable error of the average surface wind ( $ASW_e$ ) contributes to the total probable drift velocity error ( $DV_e$ ) in two ways. The  $ASW_e$  increases the total probable wind current error and the total probable leeway error. The value recorded on **line B.2** of the **Average Surface Wind (ASW) Worksheet** is an estimate of the combined effects of the increased probable errors in wind current and leeway due to the probable error in the average surface wind. **Caution:** The probable wind current error ( $WC_e$ ) entered on **line 7** of the **Wind Current (WC) Worksheet** represents **only** the probable error in the wind current estimate that still exists even when the average surface wind is precisely known. It does **not** include any error due to uncertainty about the average surface wind value used to estimate the wind current. Similarly, the probable leeway error ( $LW_e$ ) entered on **line 7** of the **Leeway (LW) Worksheet** represents **only** the probable error in the leeway estimate that still exists even when the average surface wind is precisely known. It also does **not** include any error due to uncertainty about the average surface wind value used to estimate the leeway.

### Total Water Current (TWC) Worksheet

Case Title: \_\_\_\_\_ Case Number: \_\_\_\_\_ Date: \_\_\_\_\_

Planner's Name: \_\_\_\_\_ Datum Number: \_\_\_\_\_ Search Plan: A B C \_\_\_\_\_

#### A. Observed Total Water Current (TWC)

1. Source (datum marker buoy (DMB), debris, oil) \_\_\_\_\_
2. Observed Set/Drift \_\_\_\_\_ °T \_\_\_\_\_ KTS
3. Probable Error of Observation ( $TWC_e$ ) \_\_\_\_\_ KTS
4. Go to **Part D** on the **Datum Worksheet**.

#### B. Computed Total Water Current

1. Tidal Current (TC)
  - a. Source (tidal current tables, local knowledge) \_\_\_\_\_
  - b. Tidal Current (TC) Set/Drift \_\_\_\_\_ °T \_\_\_\_\_ KTS  
(Attach any tidal current computations)
  - c. Probable Error of Tidal Current ( $TC_e$ ) \_\_\_\_\_ KTS
2. Sea Current (SC)
  - a. Source (Atlas, Pilot Chart, etc.) \_\_\_\_\_
  - b. Sea Current (SC) Set/Drift \_\_\_\_\_ °T \_\_\_\_\_ KTS
  - c. Probable Error of Sea Current ( $SC_e$ ) \_\_\_\_\_ KTS
3. Wind Current (WC)  
(Attach **Wind Current Worksheet**)
  - a. Wind Current (WC) Set/Drift \_\_\_\_\_ °T \_\_\_\_\_ KTS
  - b. Probable Error of Wind Current ( $WC_e$ ) \_\_\_\_\_ KTS

4. Other Water Current (*OWC*)
  - a. Source (local knowledge, previous drifts, etc.) \_\_\_\_\_
  - b. Other Water Current (*OWC*) Set/Drift \_\_\_\_\_ °T \_\_\_\_\_ KTS
  - c. Probable Error of Other Water Current (*OWC<sub>e</sub>*) \_\_\_\_\_ KTS
5. Computed Total Water Current (*TWC*) Set/Drift \_\_\_\_\_ °T \_\_\_\_\_ KTS
6. Computed Probable Total Water Current Error (*TWC<sub>e</sub>*) \_\_\_\_\_ KTS  
$$\left(TWC_e = \sqrt{TC_e^2 + SC_e^2 + WC_e^2 + OWC_e^2}\right)$$
7. Go to **Part D** on the **Datum Worksheet**.

## Total Water Current (TWC) Worksheet Instructions

**Introduction.** Total water current may be determined by observing the drift of objects that have little or no leeway. Total water current may also be determined or estimated using data from tidal current tables, sea current atlases, a wind current graph or computational procedure, and other sources. Often the Total Water Current will be the vector sum of two or more of these values.

None of the values will be exact and each will have at least some probable error. It is necessary to estimate the sizes of these probable errors. If two or more current vectors are added to determine the total water current, then the probable error of the total water current must be computed from the probable errors of the individual currents. This value will then be used to compute the total probable error of position.

If available, observed total water current at or near the scene is preferable to computed or estimated values. If total water current observations are available, complete **Part A** of this worksheet and record the result in **Part D** of the **Datum Worksheet**. If total water current observations are not available, complete the applicable sections of **Part B** of this worksheet and record the result in **Part D** of the **Datum Worksheet**

### A. Observed Total Water Current

Datum marker buoys (DMBs) and debris with little freeboard tend to drift with the surface current. Early observations derived from relocating identifiable objects may be questionable due to navigational error. Self-locating DMBs are generally very accurate although the data returned may require some processing to be useful.

1. Source Enter the type of object whose drift was observed to determine the total water current.
2. Observed Set/Drift Enter the true direction and drift of the observed object.
3. Probable Error of Observation ( $TWC_e$ ) Enter the estimated probable error of the observed total water current as it relates to the search object's probable starting position. Factors to consider include the probable position errors of the observations, the distance between the observations and the search object's probable starting position, the amount of time since the last observation, and the amount of variability of the currents in the area of interest. If the observations are considered to be of good to excellent quality and representative of the current at the search object's (unknown) location, enter **0.1** knots. Otherwise, enter **0.2** knots.
4. Go to **Part D** of the **Datum Worksheet** Enter the true direction and speed (**line A.2**) on **line D.1** of the **Datum Worksheet**. Enter the probable error (**line A.3**) on **line D.2** of the **Datum Worksheet**.

## B. Computed Total Water Current

Enter values only for those currents that are present at the search object's location. For any current that is not present, leave the set, drift, and probable error blank.

### 1. Tidal Current ( $TC$ )

General Rule: In coastal waters, tidal currents will usually be important. To compute tidal current, search planners should consult published Tidal Current Tables, if available, for the vicinity of the datum position. Local knowledge is also often of great value in dealing with drift due to tidal currents.

#### a. Source

Enter the source of the tidal current information.

#### b. Tidal Current ( $TC$ ) Set/Drift

Enter the true direction and speed of the average, or net, tidal current for the drift interval.

#### c. Probable Error of Tidal Current ( $TC_e$ )

Enter the estimated probable error of the computed or estimated tidal current as it relates to the search object's approximate location. Factors to consider include the distance between the reference location shown in the tidal current tables and the search object's probable starting position and the amount of variability of the currents in the area of interest. If no better estimate is available, enter **0.3** knots.

### 2. Sea Current ( $SC$ )

General Rule: Sea currents derived from long-term seasonal averages taken over a wide area (e.g., currents taken from a pilot chart or atlas of surface currents) are most useful in areas that are well off shore. Currents from these sources generally should not be used when computing total water current in coastal waters, especially when the distance from the shore of a large land mass is less than 25 miles **and** the water depth is less than 300 feet (100 metres, 50 fathoms). If local and regional data on short-term coastal surface currents are available, or if such data is available from a validated computerized circulation model, these values should be used. If not, sea current should be ignored and  $TWC$  should be calculated using only the wind current ( $WC$ ) and tidal current ( $TC$ ).

#### a. Source

Enter the source of the sea current information.

#### b. Sea Current ( $SC$ ) Set/Drift

Enter the true direction and speed of the sea current from the information source.

#### c. Probable Error of Sea Current ( $SC_e$ )

Enter the estimated probable error of the sea current as it relates to the search object's approximate location. Consider the amount of variability of the currents in the area of interest. If no better estimate is available, enter **0.3** knots.

3. Wind Current (*WC*)
 

Go to the **Wind Current Worksheet**, compute the wind current, and attach the worksheet.

  - a. Wind Current (*WC*) Set/Drift
 

Enter the true direction and speed of the wind current from **line 6** of the **Wind Current Worksheet**.
  - b. Probable Error of Wind Current (*WC<sub>e</sub>*)from
 

Enter the estimated probable error of the wind current **line 7** of the **Wind Current Worksheet**.
4. Other Water Current (*OWC*)
 

General Rule: Other Water Current is current that does not fall into one of the other categories. For example, the discharge of large rivers into the sea can affect the currents many miles from shore.

  - a. Source
 

Enter the source of this current information.
  - b. Other Water Current (*OWC*) Set/Drift
 

Enter the true direction and speed of this current from the information source.
  - c. Probable Error of Other Water Current (*OWC<sub>e</sub>*)
 

Enter the estimated probable error of this current as it relates to the search object's approximate location. Consider the amount of variability of the currents in the area of interest. If no better estimate is available, enter **0.3** knots.
5. Computed Total Water Current Set/Drift
 

Using a manoeuvring board or calculator, compute the vector sum of all the above water currents. Enter the resultant direction (set) and speed (drift) in the spaces provided.
6. Computed Total Probable Water Current Error (*TWC<sub>e</sub>*)
 

Compute the probable error of the total water current by taking the square root of the sum of all the squared water current errors. Stated as a general formula,

$$TWC_e = \sqrt{TC_e^2 + SC_e^2 + WC_e^2 + OWC_e^2}$$

Usually only some of these terms will be used. For example, if the object is well out to sea beyond tidal influence, then the term *TC<sub>e</sub>* is removed from the formula above.
7. Go to **Part D** of the **Datum Worksheet**

Enter the computed total water current true direction and speed (**line B.5**) on **line D.1** of the **Datum Worksheet**. Enter the probable total water current error (**line B.6**) on **line D.2** of the **Datum Worksheet**.

### Wind Current (WC) Worksheet

Case Title: \_\_\_\_\_ Case Number: \_\_\_\_\_ Date: \_\_\_\_\_

Planner's Name: \_\_\_\_\_ Datum Number: \_\_\_\_\_ Search Plan: A B C \_\_\_\_\_

#### Wind Current (WC)

1. Average Surface Wind (ASW) \_\_\_\_\_°T \_\_\_\_\_KTS  
(from **Datum Worksheet, line C.1**)
  
2. Down Wind Direction (ASW direction  $\pm 180^\circ$ ) \_\_\_\_\_°T
  
3. Wind Current Drift \_\_\_\_\_KTS  
(from **Figure N-1**)
  
4. Divergence of Wind Current  $\pm$  \_\_\_\_\_°  
(from **Figure N-1**)
  
5. Wind Current Set \_\_\_\_\_°T  
(Down wind direction  $\pm$  Divergence of Wind Current)  
(Add Divergence in northern hemisphere, subtract in southern hemisphere.)
  
6. Wind Current (WC) Set/Drift \_\_\_\_\_°T \_\_\_\_\_KTS
  
7. Probable Error of Wind Current ( $WC_e$ ) \_\_\_\_\_KTS
  
8. Go to **line B.3** on the **Total Water Current (TWC) Worksheet**.

## Wind Current (WC) Worksheet Instructions

**Introduction.** Local wind blowing over the ocean's surface generates a current in the water. Usually this current is in addition to the average sea current found in atlases and on pilot charts. Therefore, it is necessary to estimate this current and the probable error of the estimated value.

### Wind Current (WC)

Caution: In areas where the wind is nearly constant over long periods, like the trade winds, it may not be appropriate to add wind current to the average sea current. Also, the sea current values estimated by some computer models include the local wind current. Search planners should not compute and add wind current to this type of data.

1. Average Surface Wind (ASW) Enter the computed average surface wind from the **Datum Worksheet (line C.1)**.
2. Down Wind Direction Add (or subtract) 180° to (from) the average surface wind direction to get the down wind direction.
3. Wind Current Drift Go to **Figure N-1, Local Wind Current Graph and Table**, find the wind current that corresponds to the speed of the average surface wind on **line 1**.
4. Divergence of Wind Current Go to **Figure N-1** and find the appropriate value for the divergence of the wind current from the down wind direction based on the approximate latitude of the search object.
5. Wind Current Set In the northern hemisphere, add the divergence from **line 4** to the down wind direction from **line 2**. If the result is greater than 360°, subtract 360°. In the southern hemisphere, subtract the divergence on **line 4** from the down wind direction on **line 2**. If the result is less than zero, add 360°.
6. Wind Current (WC) Set/Drift Enter the set from **line 5** and the drift from **line 3**.
7. Probable Wind Current Error (WC<sub>e</sub>) Enter the estimated probable error of the wind current. Factors to consider include the distance between the wind observations and the search object's probable starting position, the amount of time since the last wind observation, and the amount of variability of the winds in the area of interest during the drift interval. Wind current estimates based on the average of highly variable winds tend to have larger probable errors than those based on steady winds. If no better estimate is available, enter 0.3 knots. See note below for more information.

8. Go to **line B.3** on the **Total Water Current (TWC) Worksheet** Enter the wind current set and drift (**line 6**) on **line B.3.a** of the **Total Water Current (TWC) Worksheet**. Enter the probable error of the wind current (**line 7**) on **line B.3.b** of the **Total Water Current (TWC) Worksheet**.

Note: The relationship between wind and wind current is not precisely understood, especially when there is significant variation in the wind over the interval of interest. For this reason the wind current estimate has some probable error that is independent of the probable error in the average surface wind. The probable wind current error ( $WC_e$ ) entered on **line 7** of the **Wind Current (WC) Worksheet** represents **only** the probable error in the wind current estimate that is still present even when the average surface wind is precisely known. It does **not** include any error due to uncertainty about the average surface wind value used to estimate the wind current. The additional error due to uncertainty about the average surface wind is included in the **Probable Error of Drift Velocity due to Probable Error of the Average Surface Wind (ASWDV<sub>e</sub>)** entered on **line B.2** of the **Average Surface Wind (ASW) Worksheet** and **line C.2** of the **Datum Worksheet**.

### Leeway (*LW*) Worksheet

Case Title: \_\_\_\_\_ Case Number: \_\_\_\_\_ Date: \_\_\_\_\_

Planner's Name: \_\_\_\_\_ Datum Number: \_\_\_\_\_ Search Plan: A B C \_\_\_\_\_

Search Object: \_\_\_\_\_

1. Average Surface Wind (*ASW*) \_\_\_\_\_°T \_\_\_\_\_KTS  
(from **Datum Worksheet, line C.1**)
2. Down Wind Direction (*ASW* direction  $\pm 180^\circ$ ) \_\_\_\_\_°T
3. Leeway Speed \_\_\_\_\_KTS  
(from **Figure N-2** or **N-3**)
4. Leeway Divergence Angle  $\pm$  \_\_\_\_\_°  
(from **Figure N-2** or **N-3**)
5. Leeway Directions
  - a. Left of down wind (**line 2** – **line 4**) \_\_\_\_\_°T
  - b. Right of down wind (**line 2** + **line 4**) \_\_\_\_\_°T
6. Leeway (*LW*)
  - a. Left of down wind \_\_\_\_\_°T \_\_\_\_\_KTS
  - b. Right of down wind \_\_\_\_\_°T \_\_\_\_\_KTS
7. Probable Leeway Error (*LW<sub>e</sub>*) \_\_\_\_\_KTS  
(from **Figure N-2** or **N-3**)
8. Go to **Part E** on the **Datum Worksheet**.

### Leeway (*LW*) Worksheet Instructions

**Introduction.** Leeway is the movement of an object through the water due to wind and waves acting on the object. Leeway speeds for various types of objects may be estimated by using the graphs in **Figures N-2** and **N-3**. Estimating leeway direction is more difficult. Lack of symmetry in the search object's shape either above or below the waterline may cause it to have leeway in a direction that is not directly down wind. The leeway divergence angles given in **Figures N-2** and **N-3** are the average differences between the object's direction of leeway and the down wind direction. For example, an object with a leeway divergence of  $\pm 45^\circ$  has a leeway that is, on average, either  $45^\circ$  to the left of the down wind direction or  $45^\circ$  to the right of the down wind direction. Since the leeway of objects that tend to diverge from the down wind direction is equally likely to be to the left or right of the down wind direction, it is necessary to account for both possibilities. It is also necessary to account for the probable error of the leeway estimate.

The leeway values obtained from **Figures N-2** and **N-3** are not exact. They are average values for the types of objects shown. All the values have at least some probable error. It is necessary to estimate the size of this probable error so the total probable drift error may be computed.

1. Average Surface Wind (*ASW*)                      Enter the value for the average surface wind direction and speed from the **Datum Worksheet line C.1**.
2. Down Wind Direction                              Add (or subtract)  $180^\circ$  to (from) the average surface wind direction to get the down wind direction.
3. Leeway Speed                                      Find the description in **Figure N-2** or **N-3** that most closely corresponds to the search object. Use the corresponding line on the graph and the average surface wind speed (**line 1**) to find the leeway speed. Enter this value in the blank provided.
4. Leeway Divergence Angle                      Use the same description as the one used for **line 3** to find the search object's leeway divergence angle on **Figure N-2** or **N-3**. Enter the leeway divergence angle that appears in parentheses ( ) next to the search object's description.
5. Leeway Directions
  - a. Left of Down Wind                              Subtract the leeway divergence angle (**line 4**) from the down wind direction (**line 2**). If the result is less than zero, add  $360^\circ$ .
  - b. Right of Down Wind                              Add the leeway divergence angle (**line 4**) to the down wind direction (**line 2**). If the result is greater than  $360^\circ$ , subtract  $360^\circ$ .
6. Leeway (*LW*)
  - a. Left of Down Wind                              Enter the direction from **line 5.a** and the speed from **line 3**.
  - b. Right of Down Wind                              Enter the direction from **line 5.b** and the speed from **line 3**.

7. Probable Leeway Error
- Using the same description as the one used for **line 3**, find the probable error of the search object's leeway estimate on **Figure N-2** or **N-3**. Enter the probable leeway error that appears in brackets [ ] next to the search object's description. Copy this value to **line E.3** of the Datum Worksheet. See note below for more information.
8. Go to **line E** on the **Datum Worksheet**
- Enter the "left" direction and speed from **line 6.a** on **line E.1** of the **Datum Worksheet**. Enter the "right" direction and speed from **line 6.b** on **line E.2** of the **Datum Worksheet**. Enter the probable leeway error from **line 7** on **line E.3** of the **Datum Worksheet**.

Note: **Figures N-2** and **N-3** are based on the best and latest information from leeway experiments. However, the values obtained from the graphs are not exact and are still subject to some probable error. The probable leeway error ( $LW_e$ ) entered on **line 7** of the **Leeway (LW) Worksheet** represents **only** the probable error in the leeway estimate that still exists even when the average surface wind is precisely known. It does **not** include any error due to uncertainty about the average surface wind value used to estimate the leeway. The additional error due to uncertainty about the average surface wind is included in the **Probable Error of Drift Velocity Due to Probable Error of the Average Surface Wind (ASWDV<sub>e</sub>)** entered on **line B.2** of the **Average Surface Wind (ASW) Worksheet** and **line C.2** of the **Datum Worksheet**.

**Total Probable Error of Position (E) Worksheet  
For Land and Marine Environments**

Case Title: \_\_\_\_\_ Case Number: \_\_\_\_\_ Date: \_\_\_\_\_

Planner's Name: \_\_\_\_\_ Datum Number: \_\_\_\_\_ Search Plan: A B C \_\_\_\_\_

**A. Probable Distress Incident/Initial Position Error (X)**

(Go to **line 1** to compute probable error of the distress incident position. Go to **line 6** if the starting position for this drift interval is a previous datum.)

1. Navigational Fix Error \_\_\_\_\_ NM  
(from **Table N-1** or **N-2**)
2. Dead Reckoning (DR) Error Rate \_\_\_\_\_ %  
(from **Table N-3**)
3. DR Distance Since Last Fix \_\_\_\_\_ NM
4. DR Navigational Error (**line A.2** × **line A.3**) \_\_\_\_\_ NM
5. Glide Distance (if aircraft/parachute descent heading is unknown) \_\_\_\_\_ NM
6. Probable Initial Position Error (X) \_\_\_\_\_ NM  
(X = **line A.1** + **line A.4** + **line A.5**) or  
(X = Total Probable Error of Position from **line H.2** of previous **Datum Worksheet**.)

**B. Total Probable Drift Error ( $D_e$ )**

1. Drift Interval \_\_\_\_\_ Hours  
(from **line B.2** of the **Datum Worksheet**)
2. Probable Drift Velocity Error ( $DV_e$ ) \_\_\_\_\_ KTS  
(from **line F.4** of the **Datum Worksheet**)
3. Total Probable Drift Error ( $D_e$ ) \_\_\_\_\_ NM  
( $D_e$  = **line B.1** × **line B.2**)

**C. Probable Search Facility Position Error (*Y*)**

1. Navigational Fix Error \_\_\_\_\_ NM  
(from **Table N-1** or **N-2**)
2. Dead Reckoning (DR) Error Rate \_\_\_\_\_ %  
(from **Table N-3**)
3. DR Distance Since Last Fix \_\_\_\_\_ NM
4. DR Navigational Error \_\_\_\_\_ NM  
(**line C.2** × **line C.3**)
5. Probable Search Facility Position Error (*Y*) \_\_\_\_\_ NM  
(*Y* = **line C.1** + **line C.4**)

**D. Total Probable Error of Position (*E*)**

1. Sum of Squared Errors \_\_\_\_\_ NM<sup>2</sup>  
( $E^2 = X^2 + D_e^2 + Y^2$ )
2. Total Probable Error of Position \_\_\_\_\_ NM  
( $E = \sqrt{X^2 + D_e^2 + Y^2}$ )

### Total Probable Error of Position (*E*) Worksheet Instructions

**Introduction.** The total probable error of position is a measure of the uncertainty about the search object's location and the ability of the search facilities to locate their assigned search areas accurately. Total probable error of position is used to determine the size of the optimal area to search with the available search effort. The new datum position and total probable error of position data are carried forward to the **Effort Allocation Worksheet**.

#### A. Probable Distress Incident/Initial Position Error (*X*)

If this is the first **Total Probable Error of Position Worksheet** for this case, complete **lines A.1 through A.6**. Otherwise, go directly to **line A.6** and enter the total probable error of position (*E*) from **line H.2** of the previous **Datum Worksheet**.

1. Navigational Fix Error

Enter the probable fix error based on the navigational capability of the distressed craft. **Tables N-1** and **N-2** provide estimates of probable navigational fix error based on the type of navigation and size of the distressed craft. These values may be used when more accurate information is not available.

2. Dead Reckoning (DR) Error Rate

Enter the probable error in DR position as a percentage of the distance travelled since the last navigational fix. **Table N-3** provides estimates of DR error rates based on the type and size of the distressed craft. These values may be used when more accurate information is not available.

3. DR Distance Since Last Fix

Enter the estimated distance travelled by the distressed craft since its last navigational fix.

4. DR Navigational Error

Convert the percentage on **line A.2** to a decimal fraction and multiply it by the value on **line A.3** to get the DR Navigational Error.

5. Glide Distance (aircraft/parachute)

If the incident involves an aircraft and the descent heading is unknown for either the aircraft, a parachute with a non-zero glide ratio or both, enter the maximum estimated glide distance (aircraft glide or parachute glide as appropriate). Otherwise, enter zero.

6. Probable Initial Position Error (*X*)

If **lines A.1 through A.5** were completed, compute the Probable Initial Position Error as the sum of **lines A.1, A.4, and A.5**. Otherwise, enter the total probable error of position from **line H.2** of the previous **Datum Worksheet**.

**B. Total Probable Drift Error ( $D_e$ )**

1. Drift Interval Enter the drift interval in hours from **line B.2** of the **Datum Worksheet**.
2. Probable Drift Velocity Error ( $DV_e$ ) Enter the probable drift velocity error **from line F.4** of the **Datum Worksheet**.
3. Total Probable Drift Error ( $D_e$ ) Multiply the drift interval on **line B.1** by the probable drift velocity error on **line B.2** to get the total probable drift error.

**C. Probable Search Facility Position Error ( $Y$ )**

1. Navigational Fix Error Enter the probable fix error based on the navigational capability of the search facility. **Tables N-1** and **N-2** provide estimates of probable navigational fix error based on the type of navigation and size of the search facility. These values may be used when more accurate information is not available.
2. Dead Reckoning (DR) Error Rate Enter the probable error in DR position as a percentage of the distance travelled by the search facility between navigational fixes. **Table N-3** provides estimates of DR error rates based on the type and size of the search facility. These values may be used when more accurate information is not available.
3. DR Distance Since Last Fix Enter the estimated distance travelled by the search facility between navigational fixes.
4. DR Navigational Error Convert the percentage on **line C.2** to a decimal fraction and multiply it by the value on **line C.3** to get the DR Navigational Error.
5. Probable Search Facility Position Error ( $Y$ ) Compute the Probable Search Facility Position Error as the sum of **lines C.1** and **C.4**.

**D. Total Probable Error of Position ( $E$ )**

1. Sum of Squared Errors ( $E^2$ ) Square the values on **lines A.6**, **B.3**, and **C.5**. Add the squared values together to get the sum of the squared errors ( $E^2$ ). This value will be used in the **Effort Allocation Worksheet**.
2. Total Probable Error of Position ( $E$ ) Compute the square root of the value on **line D.1** to get the total probable error of position ( $E$ ). This value will be used for search effort allocation and as the probable initial position error for the next drift interval.

**New Pages to Appendix L**

Total Available Search Effort ( $Z_{ta}$ ) Worksheet

Case Title: \_\_\_\_\_ Case Number: \_\_\_\_\_ Date: \_\_\_\_\_  
 Planner's Name: \_\_\_\_\_ Datum Number: \_\_\_\_\_ Search Plan: A B C \_\_\_\_\_  
 Datum \_\_\_\_\_ Datum \_\_\_\_\_  
 (left) Latitude Longitude (right) Latitude Longitude  
 Search Object: \_\_\_\_\_ Date/Time \_\_\_\_\_

Total Available Effort Computations

	1	2	3	4	5
1. Search Sub-area Designation	_____	_____	_____	_____	_____
2. Search Facility Assigned	_____	_____	_____	_____	_____
3. Search Facility Speed ( $V$ )	_____	_____	_____	_____	_____
4. On Scene Endurance	_____	_____	_____	_____	_____
5. Daylight Hours Remaining	_____	_____	_____	_____	_____
6. Search Endurance ( $T$ )	_____	_____	_____	_____	_____
( $T = 85\%$ of lesser of <b>line 4</b> or <b>5</b> above.)					
7. Search Altitude	_____	_____	_____	_____	_____
8. Uncorrected Sweep Width	_____	_____	_____	_____	_____
9. Weather, Terrain Correction Factor ( $f_w, f_t$ )	_____	_____	_____	_____	_____
10. Velocity Correction Factor ( $f_v$ )	_____	_____	_____	_____	_____
(aircraft only)					
11. Fatigue Correction Factor ( $f_f$ )	_____	_____	_____	_____	_____
12. Corrected Sweep Width ( $W$ )	_____	_____	_____	_____	_____
13. Available Search Effort ( $Z = V \times T \times W$ )	_____	_____	_____	_____	_____
14. Total Available Search Effort ( $Z_{ta} = Z_{a1} + Z_{a2} + Z_{a3} + \dots$ )				_____	_____ NM <sup>2</sup>
15. Separation Ratio ( $SR$ ) (leeway divergence datums only)				_____	_____
(from <b>line H.3</b> of the <b>Datum Worksheet</b> .)					
16. If the separation ratio ( $SR$ ) on <b>line 15</b> is greater than four ( $SR > 4$ ), go to the <b>Widely Diverging Datums Worksheet</b> . Otherwise, go to the <b>Effort Allocation Worksheet</b> .					

## Total Available Search Effort ( $Z_{ta}$ ) Worksheet Instructions

**Introduction.** This **Total Available Search Effort Worksheet** is used to determine the total amount of search effort that will be available on scene. This worksheet is based on a DAYLIGHT VISUAL SEARCH.

Enter the case title, case number, planner's name, datum number, search designator, datum latitudes, longitudes and time, and the primary search object in the spaces provided. All of this information may be found on the **Datum Worksheet** except possibly the planner's name. The name that appears on this worksheet should be that of the person responsible for completing this worksheet, who may be different from the person who completed the **Datum Worksheet**.

### Total Available Search Effort Computations

1. Search Sub-Area Designation      Use standard sub-area designators, such as A-1, B-3, etc.
2. Search Facility Assigned          Enter name, hull or tail number, or other identifier that uniquely identifies the search facility assigned to the corresponding search sub-area.
3. Search Facility Speed ( $V$ )        Enter the average speed made good over the ground for each search facility while searching. For aircraft, the True Airspeed (TAS) while searching is usually a satisfactory approximation.
4. On Scene Endurance                Enter the total amount of time the search facility can provide on scene. Do not include the transit time to and from the area.
5. Daylight Hours Remaining        Enter the number of hours between the search facility's estimated time of arrival on scene (start of searching) and sunset.
6. Search Endurance ( $T$ )            Compute 85% of the value on **line 4** or **line 5**, whichever is smaller. This figure represents the "productive" search time. It provides a 15% allowance for investigating sightings and navigating turns at the ends of search legs.
7. Search Altitude                    Determine the search altitude options available (See *Note* below) and enter a preliminary altitude assignment.

*Note: Recommended guidelines for determining search altitude options:*

- a. Stay at least 150 m (500 ft) below cloud bases.*
- b. Stay at least 60 m (200 ft) above the water or ground.*
- c. Use at least 150 m (500 ft) of vertical separation between aircraft that share a common search sub-area boundary.*
- d. In most cases, use altitudes in increments of 150 m (500 ft).*
- e. Additional guidance is provided in **Table N-11**.*

- |  |   |
|--|---|
| 8. Uncorrected Sweep Width                           | Enter the appropriate value from the Sweep Width Tables in Appendix N. Based on the type of search facility, use <b>Table N-4, N-5, or N-6</b> for maritime searches. Use <b>Table N-9</b> for searches over land.  |
| 9. Weather, Terrain Correction Factor ( $f_w, f_t$ ) | For maritime searches, enter the appropriate value ( $f_w$ ) from <b>Table N-7</b> . For searches over land, enter the appropriate value ( $f_t$ ) from <b>Table N-10</b> .   |
| 10. Velocity Correction Factor ( $f_v$ )             | For searches conducted by aircraft over water, enter the appropriate velocity correction factor ( $f_v$ ) from <b>Table N-8</b> . For searches conducted by vessels and for searches over land, enter <b>1.0</b> .  |
| 11. Fatigue Correction Factor ( $f_f$ )              | If there are indications that the search facility crew is or will be suffering significantly from fatigue during the search, enter <b>0.9</b> . If crew fatigue is not considered a significant factor for the assigned search facility, enter <b>1.0</b> . |
| 12. Corrected Sweep Width ( $W$ )                    | Multiply the values in each column on <b>lines 8, 9, 10, and 11</b> (uncorrected sweep width, weather/ terrain correction factor, velocity correction factor and fatigue correction factor) to get the corrected sweep width.                               |
| 13. Available Search Effort ( $Z$ )                  | Multiply the search facility's speed ( <b>line 3</b> ) by the search facility's endurance ( <b>line 6</b> ) and multiply the result by the corrected sweep width ( <b>line 12</b> ), or use <b>Figure N-4</b> .   |
| 14. Total Available Search Effort ( $Z_{ta}$ )       | Add the individual Available Search Effort values listed on <b>line 13</b> and enter the total.   |
| 15. Separation Ratio ( $SR$ )                        | Enter the separation ratio ( $SR$ ) from <b>line H.3</b> of the <b>Datum Worksheet</b> .  |

16. In most cases, the separation ratio ( $SR$ ) will be less than or equal to four ( $SR \leq 4$ ) and the search planner may go directly to the **Effort Allocation Worksheet**. However, if the separation ratio ( $SR$ ) entered on **line 15** is greater than four ( $SR > 4$ ), an initial effort allocation decision must be made between the following two choices:

- The two datums may be treated as separate single point datums, each with its own search area. Two separate search areas with no overlap will be the usual result.
- A line may be drawn between the two datums and treated as the base line portion of a datum line. In this case a single search area centred on the datum line will be the result.

The **Widely Diverging Datums Worksheet Instructions** provide guidance to help the search planner decide which alternative to use. The **Widely Diverging Datums Worksheet** helps the search planner make the necessary preparations for entering the **Effort Allocation Worksheet(s)**.

The following conditions can lead to leeway divergence datums becoming so widely separated in comparison to their total probable errors of position that separate search areas should be considered:

- The leeway divergence angle is large ( $> 30^\circ$ ).
- The leeway rate is moderate to large ( $> 1$  knot).
- The time adrift is significant ( $> 12$  hours).
- The probable errors of the initial and search facility positions are small ( $< 1$  NM).
- The probable errors of the factors affecting drift (winds, currents, leeway) are all small ( $< 0.3$  knot).
- The cumulative relative search effort is small to moderate ( $< 10$ ).

Usually all of these conditions must be met before the separation ratio will become greater than four ( $SR > 4$ ) and the divergence distance ( $DD$ ) will be large enough to justify dividing the available search effort into two portions assigned to separate, non-contiguous search areas. Only rarely will enough of these conditions be met to create such a situation.

### Widely Diverging Datums Worksheet

Case Title: \_\_\_\_\_ Case Number: \_\_\_\_\_ Date: \_\_\_\_\_

Planner's Name: \_\_\_\_\_ Datum Number: \_\_\_\_\_ Search Plan: A B C \_\_\_\_\_

Datum	_____	_____	Datum	_____	_____
(left)	Latitude	Longitude	(right)	Latitude	Longitude

Search Object: \_\_\_\_\_ Date/Time \_\_\_\_\_

1. Total Available Search Effort ( $Z_{ta}$ ) \_\_\_\_\_ NM<sup>2</sup>  
 (from **line 14** of the **Total Available Search Effort Worksheet**)
  
2. Divergence Distance ( $DD$ ) \_\_\_\_\_ NM  
 (from **line G.3** of the **Datum Worksheet**)
  
3. Total Probable Error of Position ( $E$ ) \_\_\_\_\_ NM  
 (from **line H.2** of the **Datum Worksheet**)
  
4. Type of Datum to use for Planning this Search (Circle one)
  - a. Two Separate Point Datums (Go to **line 5**.)
  - b. A Line Datum between Two Point Datums (Go to **line 6**.)
  
5. Two Separate Point Datums
  - a. Search Effort Available for the Left Datum ( $Z_{a(left)}$ ) \_\_\_\_\_ NM<sup>2</sup>
  - b. Search Effort Available for the Right Datum ( $Z_{a(right)}$ ) \_\_\_\_\_ NM<sup>2</sup>
  - c. Total Available Search Effort ( $Z_{ta} = Z_{a(left)} + Z_{a(right)}$ ) \_\_\_\_\_ NM<sup>2</sup>  
 (must equal value on **line 1**)
  - d. Go to the **Effort Allocation Sheets** (one for each datum) and follow the instructions for single point datums.
  
6. A Line Datum between Two Point Datums
  - a. Length of the Datum Line [ $L = DD + (2 \times E)$ ] \_\_\_\_\_ NM
  - b. Go to the **Effort Allocation Sheet** and follow the instructions for a line datum.

## Widely Diverging Datums Worksheet Instructions

**Introduction:** It is possible for objects that have leeway divergence to have two widely separated datums whose associated probability density distributions have little or no overlap. When the distance between the datums is large in comparison to the probable error of each datum position, the search planner must decide whether they should be treated as two separate single point datums or as the end points of the base line portion of a datum line.

Experimental evidence indicates that once an object starts to have a leeway to the left of the down wind direction it tends to remain on that tack indefinitely. The same is true if the object starts to have a leeway to the right of the down wind direction. If the initial and search facility probable position errors are small, the leeway divergence angle is large ( $> 30^\circ$ ), the probable errors of the winds, currents and leeway are all small (each contributing less than 0.3 knot to the drift velocity error), etc., the divergence distance (*DD*) may become greater than four times the probable error of position (*E*). This is an unlikely situation. However, if it occurs, the search planner should seriously consider applying a portion of the available search effort to each datum rather than applying the total available search effort to a single large area that includes both datums and the area between them. Objects that have large divergence angles will tend toward locations on the line connecting the left and right datums only if they jibe or tack down wind. There has been very little evidence of jibing behaviour in the leeway experiments done to date. This means that when the probable errors are small and the divergence angle is large, there is very little chance of the search object being halfway between the left and right datums. If this is the case, then the area that is near the midpoint of the line connecting the left and right datums will not be a very productive area to search.

If the search planner decides to treat the two datums separately, then it is necessary to divide the total available search effort into two portions and plan two single point datum searches. Unless there is some reason to favour one datum over the other, the total available search effort should be divided into two equal portions. One example of a situation where one datum should be favoured over the other is the following: Suppose a drifting search object was located by an aircraft and observed long enough to determine its leeway was to the right of the down wind direction, but then contact was lost before a homing beacon could be deployed or a rescue facility could arrive on scene. In this case, the datum for the next search that was to the right of the down wind direction probably should be assigned most of the total available search effort. Whenever search effort is to be allocated separately to two datums, an **Effort Allocation Worksheet** should be completed for each datum, using the instructions for a single point datum.

In situations where the wind has shown large and sudden changes in direction, when the sea is confused, etc., the search planner may decide that the probability of the search object jibing or tacking down wind is larger than usual. The search planner may have other reasons for covering all of the area between the left and right datums. In these cases, the search planner should consider drawing a line between the left and right datums and using it as the base line portion of a datum line. When the total available search effort is to be allocated in this fashion, a single **Effort Allocation Worksheet** should be completed following the instructions for a datum line.

1. Total Available Search Effort ( $Z_{ta}$ ) Enter the total available search effort ( $Z_{ta}$ ) from **line 14** of the **Total Available Search Effort Worksheet**.
2. Divergence Distance ( $DD$ ) Enter the divergence distance ( $DD$ ) from **line G.3** of the **Datum Worksheet**.
3. Total Probable Error of Position ( $E$ ) Enter the total probable error of position from **line H.2** of the **Datum Worksheet**. (Note: The value of  $DD$  on **line 2** should be more than four times the value of  $E$  on this line ( $DD > 4 \times E$ ). If this is **not** true, discard this worksheet and go directly to the **Effort Allocation Worksheet**.)
4. Type of Datum Decide whether to plan the next search around two separate datums or along a datum line that passes through the left and right datums. Circle “a” or “b” as appropriate. If “a” is circled, go to **line 5**. If “b” is circled, go to **line 6**.
5. Two Separate Point Datums

In this case, the total available search effort is to be divided into two parts. One part will be applied to a search area centred on one of the datums while the other part will be applied to a search area centred on the other datum.

  - a. Search Effort Available for the Left Datum ( $Z_{a(left)}$ ) Enter the amount of search effort that will be applied to the left datum. This amount must be between zero and the total available search effort ( $0 \leq Z_{a(left)} \leq Z_{ta}$ ).
  - b. Search Effort Available for the Right Datum ( $Z_{a(right)}$ ) Enter the amount of search effort that will be applied to the right datum. This amount must be between zero and the total available search effort ( $0 \leq Z_{a(right)} \leq Z_{ta}$ ).
  - c. Total Available Search Effort ( $Z_{ta} = Z_{a(left)} + Z_{a(right)}$ ) Add the search effort available for the left datum (**line 5.a**) to the search effort available for the right datum (**line 5.b**). The result should equal the total available search effort (**line 1**). If this is not true, adjust the efforts for the left and right datums so their sum equals the total available search effort (**line 1**).
  - d. Go to **Effort Allocation Worksheets** Complete an **Effort Allocation Worksheet** for each datum. Enter the search effort available for the left datum ( $Z_{a(left)}$ ) on **line 1** of the **Effort Allocation Worksheet** for the left datum. On a second **Effort Allocation Worksheet**, enter the search effort available for the right datum ( $Z_{a(right)}$ ) on **line 1**.

6. A Line Datum between Two Point Datums

In this case, a single search area is to be centred on the line connecting the left and right datums.

a. Length of the Datum Line ( $L$ )

Compute the length of the datum line by adding twice the total probable error of position ( $E$ ) from **line 3** to the divergence distance ( $DD$ ) from **line 2**. Stated as a formula,  $L = DD + (2 \times E)$ .

b. Go to the **Effort Allocation Worksheet**.

Go to the **Effort Allocation Worksheet**. Enter the total available search effort ( $Z_{ta}$ ) from **line 1** of this worksheet as the available search effort ( $Z_a$ ) on **line 1** of the **Effort Allocation Worksheet**. Enter the length of the datum line ( $L$ ) from **line 6.a** as the length of the datum line ( $L$ ) on **line 2.b** of the **Effort Allocation Worksheet**. Follow the effort allocation instructions for line datums.

### Effort Allocation Worksheet

#### For Optimal Search of Single Point, Leeway Divergence, or Line Datums

Case Title: \_\_\_\_\_ Case Number: \_\_\_\_\_ Date: \_\_\_\_\_

Planner's Name: \_\_\_\_\_ Datum Number: \_\_\_\_\_ Search Plan: A B C \_\_\_\_\_

Datum \_\_\_\_\_ Datum \_\_\_\_\_  
 (left) Latitude Longitude (right) Latitude Longitude

Datum \_\_\_\_\_  
 Date/Time Search Object

#### Effort Allocation Computations

1. Available Search Effort ( $Z_a$ ) \_\_\_\_\_ NM<sup>2</sup>  
 (from **line 14** of **Total Available Search Effort Worksheet** or  
**line 5.a** or **line 5.b** of the **Widely Diverging Datums Worksheet**)
  
2. Effort Factor ( $f_z$ )
  - a. Total Probable Error of Position ( $E$ ) \_\_\_\_\_ NM
  - b. Length of Datum Line ( $L$ ) \_\_\_\_\_ NM
  - c. Effort Factor ( $f_z$ ) ( $f_{zp} = E^2$  or  $f_{zl} = E \times L$ ) \_\_\_\_\_ NM<sup>2</sup>
  
3. Relative Effort ( $Z_r = Z_a/f_z$ ) \_\_\_\_\_
  
4. Cumulative Relative Effort ( $Z_{rc} = \text{Previous } Z_{rc} + Z_r$ ) \_\_\_\_\_
  
5. Optimal Search Factor ( $f_s$ ) Ideal \_\_\_\_\_ Poor \_\_\_\_\_ ( $f_s$ ) \_\_\_\_\_
  
6. Optimal Search Radius ( $R_o = f_s \times E$ ) \_\_\_\_\_ NM
  
7. Optimal Search Area ( $A_o$ ) \_\_\_\_\_ NM<sup>2</sup>
  - a. Single Point Datum ( $A_o = 4 \times R_o^2$ )
  - b. Leeway Divergence Datums [ $A_o = (4 \times R_o^2) + (2 \times R_o \times DD)$ ]
  - c. Line Datum ( $A_o = 2 \times R_o \times L$ )
  
8. Optimal Coverage Factor ( $C_o = Z_a/A_o$ ) \_\_\_\_\_

- |   | 1     | 2     | 3     | 4                                 | 5                    |
|---|-------|-------|-------|-----------------------------------|----------------------|
| 9. Optimal Track Spacing ( $S_o = W/C_o$ )  | _____ | _____ | _____ | _____                             | _____                |
| 10. Nearest Assignable Track Spacing ( $S$ )<br>(within limits of search facility navigational capability)      | _____ | _____ | _____ | _____                             | _____                |
| 11. Adjusted Search Areas ( $A = V \times T \times S$ )   | _____ | _____ | _____ | _____                             | _____                |
| 12. Total Adjusted Search Area ( $A_t = A_1 + A_2 + A_3 + \dots$ )  |       |       |       |                                   | _____NM <sup>2</sup> |
| 13. Adjusted Search Radius ( $R$ )  |       |       |       |                                   | _____NM              |
| <p>a. Single Point Datum <math display="block">R = \frac{\sqrt{A_t}}{2}</math></p>                              |       |       |       |                                   |                      |
| <p>b. Leeway Divergence Datums <math display="block">R = \frac{\sqrt{DD^2 + (4 \times A_t)} - DD}{4}</math></p> |       |       |       |                                   |                      |
| <p>c. Line Datum <math display="block">R = \frac{A_t}{2 \times L}</math></p>                                    |       |       |       |                                   |                      |
| 14. Adjusted Search Area Dimensions   |       |       |       |                                   |                      |
| a. Length   |       |       |       | Length                            | _____NM              |
| i.) Single Point Datum  |       |       |       | $Length = 2 \times R$             |                      |
| ii.) Leeway Divergence Datums   |       |       |       | $Length = (2 \times R) + DD$      |                      |
| iii.) Line Datum  |       |       |       | Length of the Base Line ( $L_b$ ) | _____NM              |
| a.) No Extensions   |       |       |       | $Length = L_b$                    |                      |
| b.) One Extension   |       |       |       | $Length = R + L_b$                |                      |
| c.) Two Extensions  |       |       |       | $Length = (2 \times R) + L_b$     |                      |
| b. Width = $2 \times R$   |       |       |       | Width                             | _____NM              |
| 15. Plot the adjusted search area on a suitable chart   |       |       |       | (Check when done)                 | _____                |
| 16. Divide the adjusted search area in to search sub-areas according to the values on <b>line 11</b> .          |       |       |       | (Check when done)                 | _____                |
| 17. Go to the <b>Search Action Plan Worksheet</b> .   |       |       |       |                                   |                      |

## Effort Allocation Worksheet Instructions

### For Optimal Search of Single Point, Leeway Divergence, or Line Datums

**Introduction.** This **Effort Allocation Worksheet** is used to determine the optimal way to allocate the available search effort around a single datum point, over two divergent datum points or along a datum line. It considers the search effort that several dissimilar search facilities can provide. The worksheet also aids in computing the optimal area to search and the optimum uniform coverage factor. Finally, the worksheet provides guidance for determining the actual search sub-area dimensions for each available search facility. This worksheet is based on a DAYLIGHT VISUAL SEARCH.

Enter the case title, case number, datum number, search designator, datum latitude, longitude and time, and the primary search object from the **Datum Worksheet**. In the space labelled "Planner's Name," enter the name of the person responsible for completing this worksheet.

#### Effort Allocation Computations

1. Available Search Effort ( $Z_a$ )

Enter the total available search effort ( $Z_{ta}$ ) from **line 14** of the **Total Available Search Effort Worksheet** unless the left and right datums are to be treated as separate searches. In that case, two **Effort Allocation Worksheets** will be required. Enter the available effort for the left datum ( $Z_{a(left)}$ ) on one worksheet and the available effort for the right datum ( $Z_{a(right)}$ ) on the other worksheet.
2. Effort Factor ( $f_z$ )

The effort factor ( $f_z$ ) provides a standard method for characterizing the size of the area where the search object is probably located. Although the effort factor has units of *area*, its value is only a fraction of the area where the search object may be located.

  - (a) Total Probable Error of Position ( $E$ )

Enter the total probable error of position ( $E$ ) from **line H.2** of the **Datum Worksheet**.
  - (b) Length of Datum Line ( $L$ )

**For line datums only:** Measure or compute the length of the base line ( $L_b$ ) connecting two points, such as the last known position of a vessel or aircraft and the next point at which a report was expected but not received. When appropriate, extend the base line in one or both directions by an amount equal to  $E$  to form the datum line ( $L$ ). Examples:

    - (i) A vessel's intended track lies between two ports, the LKP was the port of departure and the vessel is overdue at its destination. The base line is not extended over land in either direction and  $L = L_b$ .

(ii) A vessel's intended track lies between its last reported position at sea and its next port of call, where it is overdue. In this situation, the seaward end of the base line is extended by  $E$  and  $L = L_b + E$ .

(iii) Both the last reported position and the next position where the vessel or aircraft was expected to report might be in error. In this situation, both ends of the base line are extended by  $E$  and  $L = L_b + 2 \times E$ . **Figure L-4** depicts this situation.

(iv) The length of the datum line was computed on **line 6.a** of the **Widely Diverging Datums Worksheet**. In this situation, the divergence distance ( $DD$ ) was used as the length of the base line ( $L_b$ ) that was then extended in both directions to form the datum line, as shown in **Figure L-4**.

Enter the value of  $L$  on **line 2.b** if this effort allocation is for a datum line. Otherwise, leave blank.

(c) Effort Factor ( $f_z$ )

For single and diverging point datums, enter the total probable error of position squared ( $E^2$ ) from **line H.1** of the **Datum Worksheet** or square the total probable error of position ( $E$ ) from **line 2.a**. Stated as a formula,  $f_{zp} = E^2$ . For line datums, multiply the total probable error of position ( $E$ ) from **line 2.a** by the length of the datum line ( $L$ ) from **line 2.b**. Stated as a formula,  $f_{zl} = E \times L$ .

3. Relative Effort ( $Z_r$ )

The relative effort ( $Z_r$ ) shows the relationship between the available search effort ( $Z_a$ ) and the size of the area where the search object may be located. The relative effort ( $Z_r$ ) is computed as the ratio of the available effort ( $Z_a$ ) to the effort factor ( $f_z$ ). Divide the available effort ( $Z_a$ ) from **line 1** by the effort factor ( $f_z$ ) from **line 2.c**.

4. Cumulative Relative Effort ( $Z_{rc}$ )

Add the relative effort ( $Z_r$ ) on **line 3** to the cumulative relative effort ( $Z_{rc}$ ) from **line 4** of the previous **Effort Allocation Worksheet**. If this is the first search, enter the value of  $Z_r$  from **line 3** above. If this is the first time two leeway divergence datums are being treated separately, assume one half of the relative effort ( $Z_{rc}$ ) from **line 4** of the previous **Effort Allocation Worksheet** was applied to each datum.

5. Optimal Search Factor ( $f_s$ )

Check "Ideal" or "Poor" search conditions, as appropriate. If any of the correction factors on **lines 9, 10** or **11** of the **Total Available Search Effort Worksheet** are less than **1.0**, or if any probable search facility position error exceeds the corresponding corrected sweep width, check "Poor" search conditions. Otherwise, check "Ideal" search conditions. Enter the optimal search factor ( $f_s$ ) from the appropriate graph and curve in **Appendix N (Figure N-5** or **N-6** for single point and leeway divergence datums, **Figure N-7** or **N-8** for line datums).

6. Optimal Search Radius ( $R_o$ )

Multiply the optimal search factor ( $f_s$ ) from **line 5** by the total probable error of position ( $E$ ) from **line 2.a**.

7. Optimal Search Area ( $A_o$ )
- The optimal search area depends on whether the type of datum is (a) a single point datum, (b) two leeway divergence datums, or (c) a line datum.
- a. Single Point Datum
- For a single point datum, square the optimal search radius ( $R_o$ ) from **line 6** and multiply by four. Stated as a formula,  $A_o = 4 \times R_o^2$ .
- b. Leeway Divergence Datums
- For two leeway divergence datums, copy the divergence distance ( $DD$ ) between the two datums from **line G.3** of the **Datum Worksheet** to **line 7.b** of this worksheet. Compute the optimal search area ( $A_o$ ) using the following formula:  $A_o = (4 \times R_o^2) + (2 \times R_o \times DD)$ .
- c. Line Datum
- For a line datum, multiply twice the optimal search radius ( $R_o$ ) from **line 6** by the length of the datum line ( $L$ ) from **line 2.b**. Stated as a formula,  $A_o = 2 \times R_o \times L$ .
8. Optimal Coverage Factor ( $C_o$ )
- Divide the available search effort ( $Z_a$ ) from **line 1** by the optimal search area ( $A_o$ ) from **line 7**.
9. Optimal Track Spacing ( $S_o$ )
- Divide the corrected sweep widths ( $W$ ) from **line 12** of the **Total Available Search Effort Worksheet** by the optimal coverage factor ( $C_o$ ) from **line 8**.
10. Nearest Assignable Track Spacing ( $S$ )
- Round the optimal track spacing ( $S_o$ ) from **line 9** to a value that the corresponding search facility can navigate safely and accurately.
11. Adjusted Search Areas ( $A$ )
- Multiply the search facility's speed from **line 3** of the **Total Available Search Effort Worksheet** by the search facility's endurance from **line 6** of the **Total Available Search Effort Worksheet** and multiply the result by the nearest assignable track spacing from **line 10** of this worksheet. Stated as a formula,  $A = V \times T \times S$ . **Figure N-9** may also be used to find the adjusted search areas.
12. Total Adjusted Search Area ( $A_t$ )
- Add the individual Adjusted Search Area values listed on **line 11** and enter the total.
13. Adjusted Search Radius
- The adjusted search radius ( $R$ ) depends on whether the type of datum is (a) a single point datum, (b) two leeway divergence datums, or (c) a line datum.

a. Single Point Datum

For single point datums, the adjusted search radius ( $R$ ) is one-half the square root of the total adjusted search area ( $A_t$ ) from **line 12**. Stated as a formula,

$$R = \frac{\sqrt{A_t}}{2}$$

b. Leeway Divergence Datums

For two diverging point datums, the search planner must adjust the search radius so the area of the actual search rectangle equals the total adjusted search area ( $A_t$ ) from **line 12**. The following formula is used to compute an adjusted search radius ( $R$ ) for the circles around each datum.

$$R = \frac{\sqrt{DD^2 + (4 \times A_t)} - DD}{4},$$

c. Line Datum

For a line datum, divide the total adjusted search area ( $A_t$ ) from **line 12** by twice the length of the datum line ( $L$ ) from **line 2.a** to get the adjusted search radius. Stated as a formula,

$$R = \frac{A_t}{2 \times L}$$

14. Adjusted Search Area Dimensions

Choose the correct type of datum below, compute the length of the adjusted search area on **line 14.a** and the width of the adjusted search area on **line 14.b** using the formulas provided.

a. Length

The formula used to find the length of the adjusted search area depends on whether the type of datum is (i) a single point datum, (ii) two leeway divergence datums, or (iii) a line datum.

i. Single Point Datum

The adjusted search area is a square with its length equal to twice the adjusted search radius from **line 13**. Stated as a formula,

$$Length = 2 \times R$$

ii. Leeway Divergence Datums

The length of the adjusted search area is found by adding twice the adjusted search radius ( $R$ ) from **line 13** to the divergence distance ( $DD$ ). Stated as a formula,

$$Length = (2 \times R) + DD$$

iii. Line Datum

Enter the length of the base line portion ( $L_b$ ) of the datum line. The length of the adjusted search area depends on whether the datum line was formed with zero, one, or two extensions as described in the instructions for **line 2.b**.

- a.) No Extensions      If the base line was not extended in either direction to form the datum line, then the length of the adjusted search area is the same as the length of the base line ( $L_b$ ).

$$Length = L_b$$

- b.) One Extension      If only one end of the base line was extended to form the datum line, then the length of the adjusted search area is the adjusted search radius ( $R$ ) plus the length of the base line ( $L_b$ ).

$$Length = R + L_b$$

- c.) Two Extensions      If the base line was extended in both directions to form the datum line, then the length of the adjusted search area is twice the adjusted search radius ( $R$ ) plus the length of the base line ( $L_b$ ).

$$Length = (2 \times R) + L_b$$

- b. Width      The formula used to find the width of the adjusted search area is the same in all cases. The width is always equal to twice the adjusted search radius ( $R$ ). Stated as a formula,

$$Width = 2 \times R$$

15. Plot the adjusted search area on a suitable chart      Using a suitable chart, plot the adjusted search square(s) or rectangle centred on the datum(s).

- a. Single Point Datum      Using the datum position as the centre, draw a circle with its radius equal to the adjusted search radius ( $R$ ) from **line 13**. Estimate the direction of search object drift during the search. Circumscribe a square around the circle and orient the square so the search legs will be parallel to the predicted direction of drift during the search. In **Figure L-1** it is assumed the direction of drift during the search will be the same as the average direction of drift from the last known position.

- b. Leeway Divergence Datums      Using each of the datum positions as a centre, draw a circle around each datum with its radius equal to the adjusted search radius ( $R$ ) from **line 13**. Based on the distance separating the circles, decide whether to use a single rectangle as shown in **Figure L-2** or two squares as shown in **Figure L-3**. Estimate the directions of search object drift during the search. Orient the search sub-areas so the search legs are as nearly parallel as possible to the predicted directions of search object drift during the search. However, do not compromise safety of search facility navigation in adjacent search sub-areas.

- c. Line Datum
- Instructions for plotting the adjusted search area depend on whether the datum line was formed with zero, one, or two extensions as described in the instructions for **line 2.b**.
- i.) No Extensions
- If the base line was not extended in either direction to form the datum line, draw lines perpendicular to the base line at each end. On each of these perpendicular lines, use a compass or dividers to measure a distance equal to the adjusted search radius ( $R$ ) in each direction from the datum line. Using these four points as the corner points, plot the rectangular adjusted search area. (See **Figure L-5**.)
- ii.) One Extension
- If the base line was extended in only one direction to form the datum line, draw a line perpendicular to the base line at the end that was **not** extended. Measure a distance equal to the adjusted search radius ( $R$ ) in each direction from the datum line along the perpendicular line. These two points will be two of the corner points of the rectangular adjusted search area. Using the other end of the **base line** as the centre, draw a circle with its radius equal to the adjusted search radius ( $R$ ). Draw a rectangle that includes the previous two corner points and the circle. (See **Figure L-6**.)
- iii.) Two Extensions
- If the base line was extended in both directions to form the datum line, draw a circle with a radius equal to the adjusted search radius ( $R$ ) around each end point of the **base line**. Be certain to use the end points of the **base line** as the centres of the circles, not the end points of the datum line. Circumscribe a single rectangle around both circles. (See **Figure L-7**.)
16. Adjust the locations, lengths and widths of the search sub-areas so they fill the total adjusted search area as nearly as possible. The following guidelines may be used:
- The width of each search sub-area must equal a whole number of track spacings. Some adjustment of track spacings may be made, but care must be taken to ensure all track spacings remain within the usable limits of the assigned search facility's navigational capability.
  - The search legs should be parallel to the search object's anticipated direction of movement during the search.
  - For fixed-wing aircraft, a flying time of about 30 minutes per search leg is recommended. For rotary wing aircraft, a flying time of about 20 minutes is recommended.

*Note 1: POS values tend to be very stable near the point of perfectly optimal effort allocation. This allows search planners the freedom needed to adapt the optimal allocation of effort to account for practical considerations imposed by the environment and the capabilities of the search facilities. Normally, small changes from the optimal values indicated in lines 10-14 that are needed to make the search plan practical will not have a large impact on search effectiveness (POS).*

Note 2: Do not use the POS graphs (**Figures N-11 and N-12**) for searches of leeway divergence datums. The variations in the relationship between divergence distance and the probable error of position create a situation that is too complex to represent on a graph. For the same reason, no templates for constructing probability maps for two leeway divergence datums are provided in Appendix M.

17. Go to the **Search Action Plan Worksheet** where the plotted search sub-areas of **line 16** will be specified in one of the standard formats (methods) such as the corner-point method. The search action plan will also provide all necessary co-ordination instructions such as assigning specific search facilities to specific search sub-areas, search patterns, altitudes to each aircraft, commence search points, direction of creep (for parallel sweep and creeping line search patterns), etc.

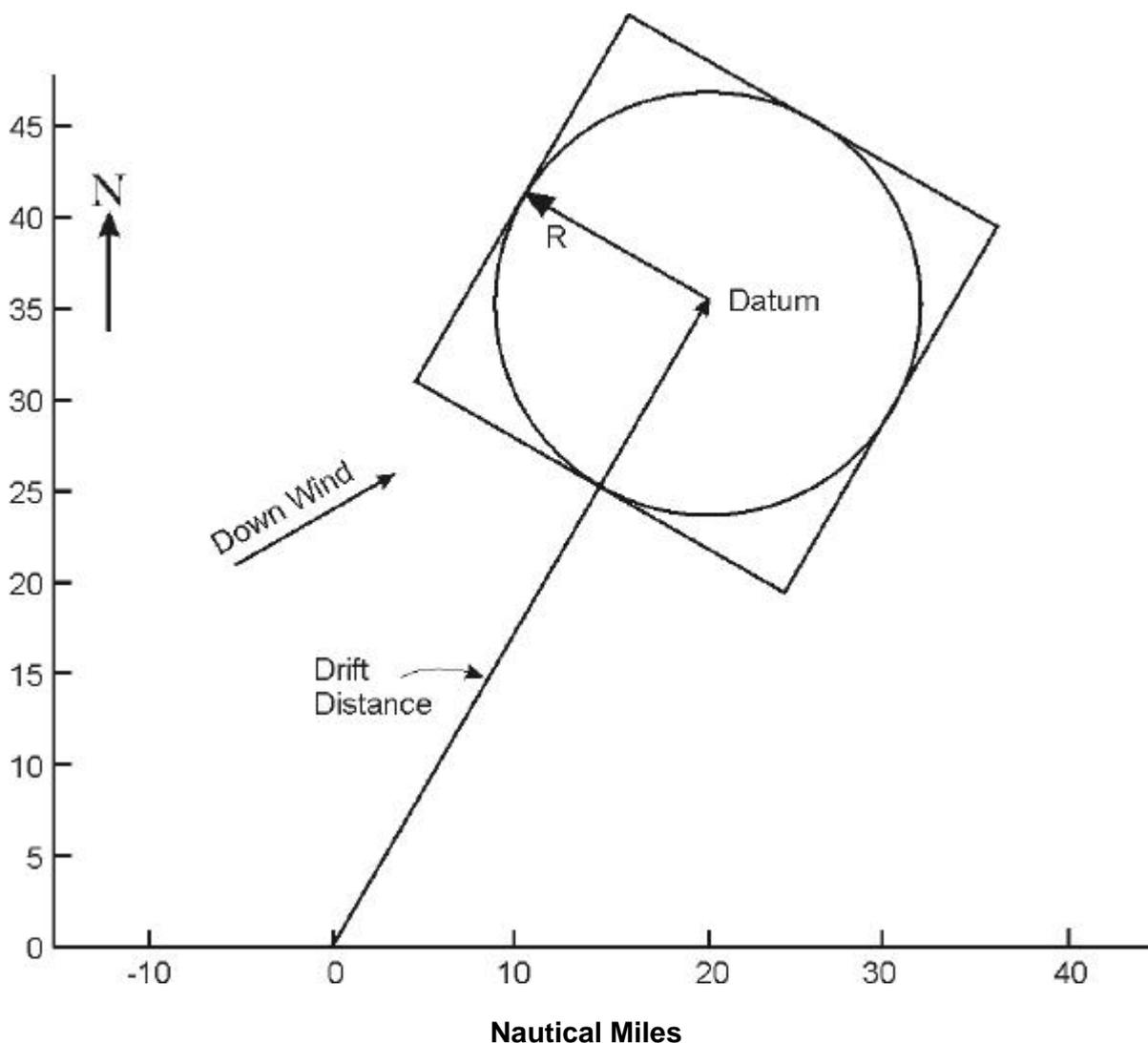


Figure L-1 – Search Area for a Single Point Datum

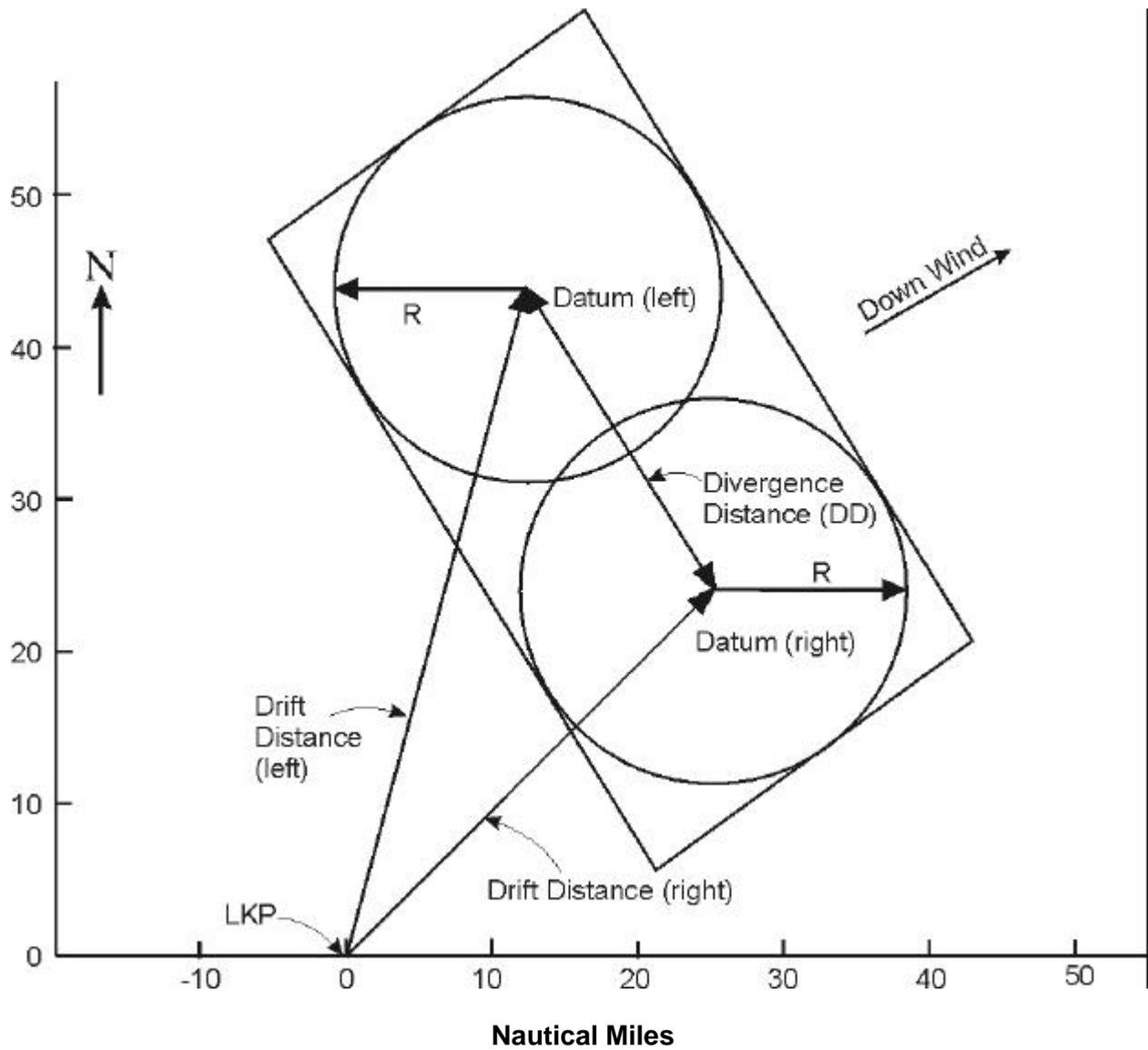


Figure L-2 – Search Area for Two Leeway Divergence Datums  
When the Leeway Divergence Distance ( $DD$ ) Is Less Than  $4 \times E$ .

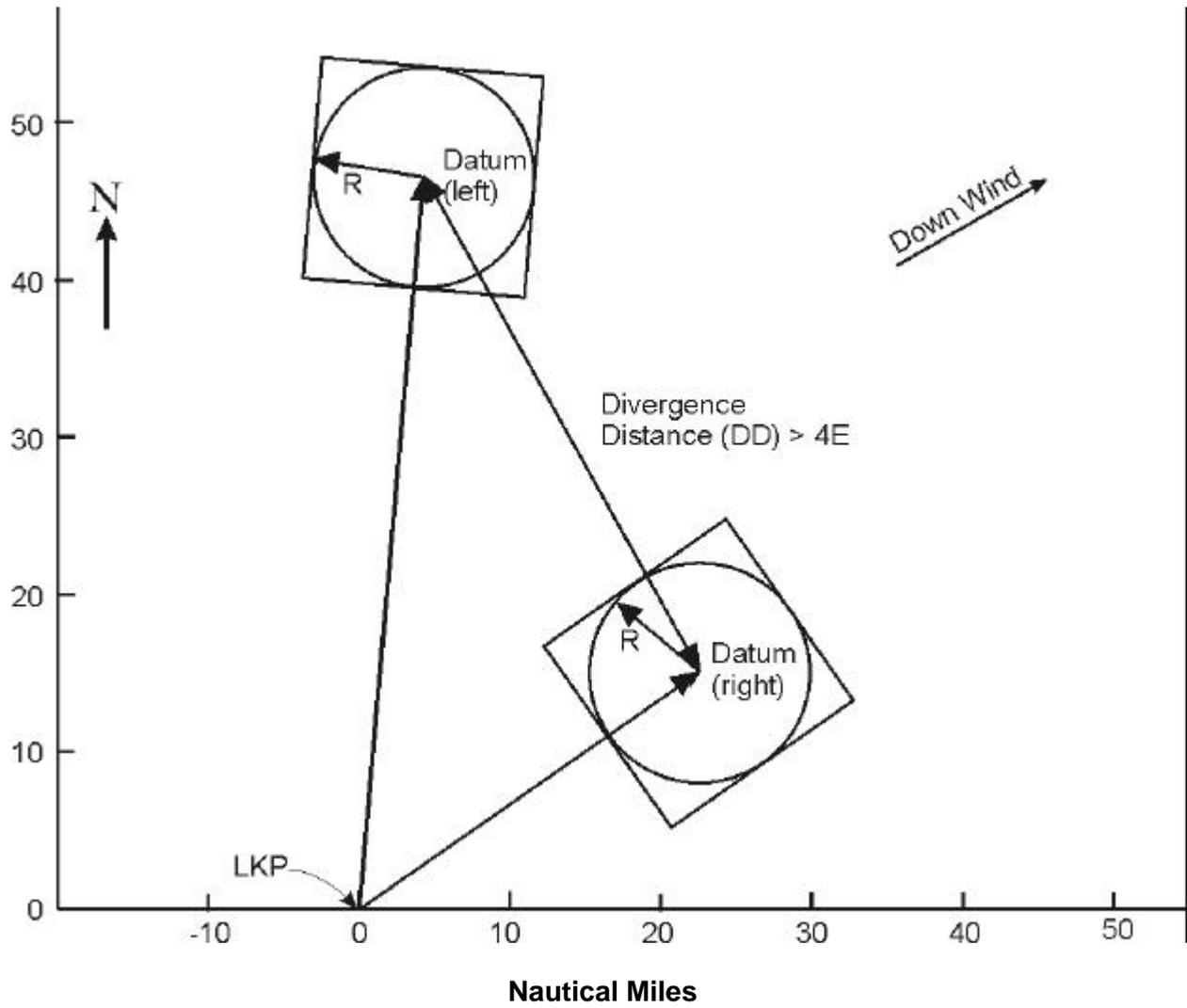


Figure L-3 – Search Areas for Two Leeway Divergence Datums  
When the Leeway Divergence Distance ( $DD$ ) is Greater Than  $4 \times E$ .

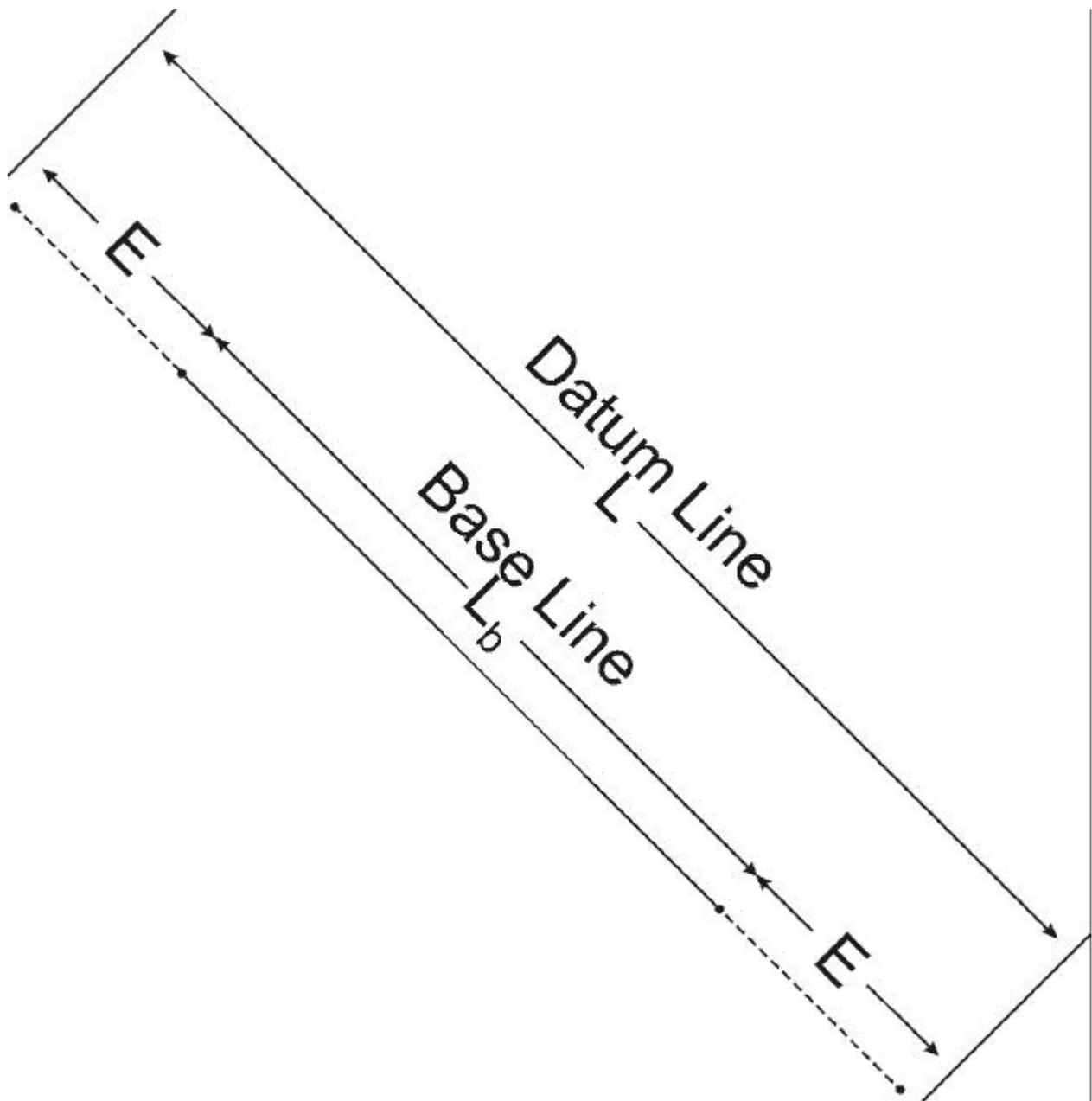


Figure L-4 – Forming a Datum Line from a Base Line

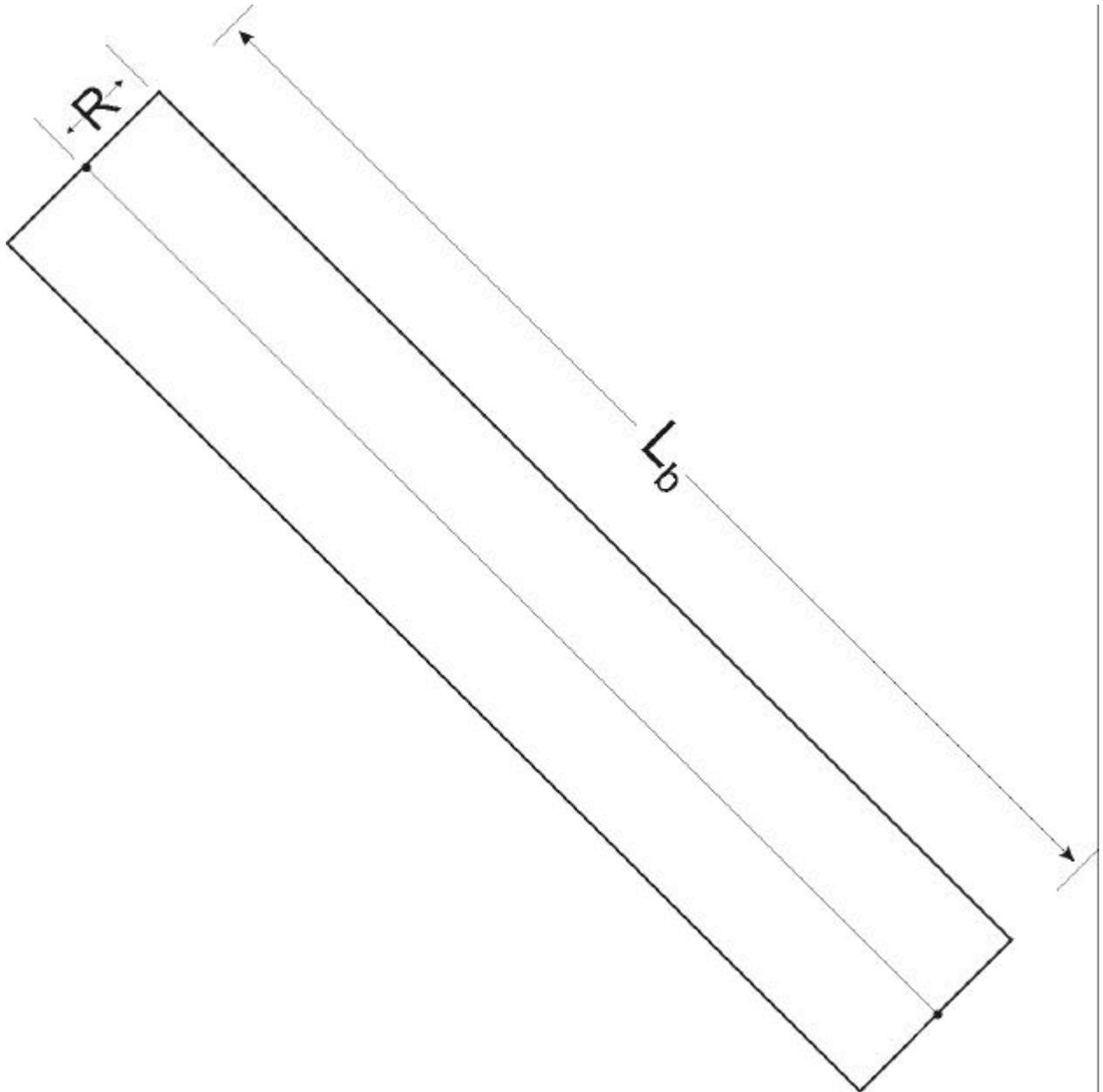


Figure L-5 – Search Area for a Line Datum (Neither End Extended)

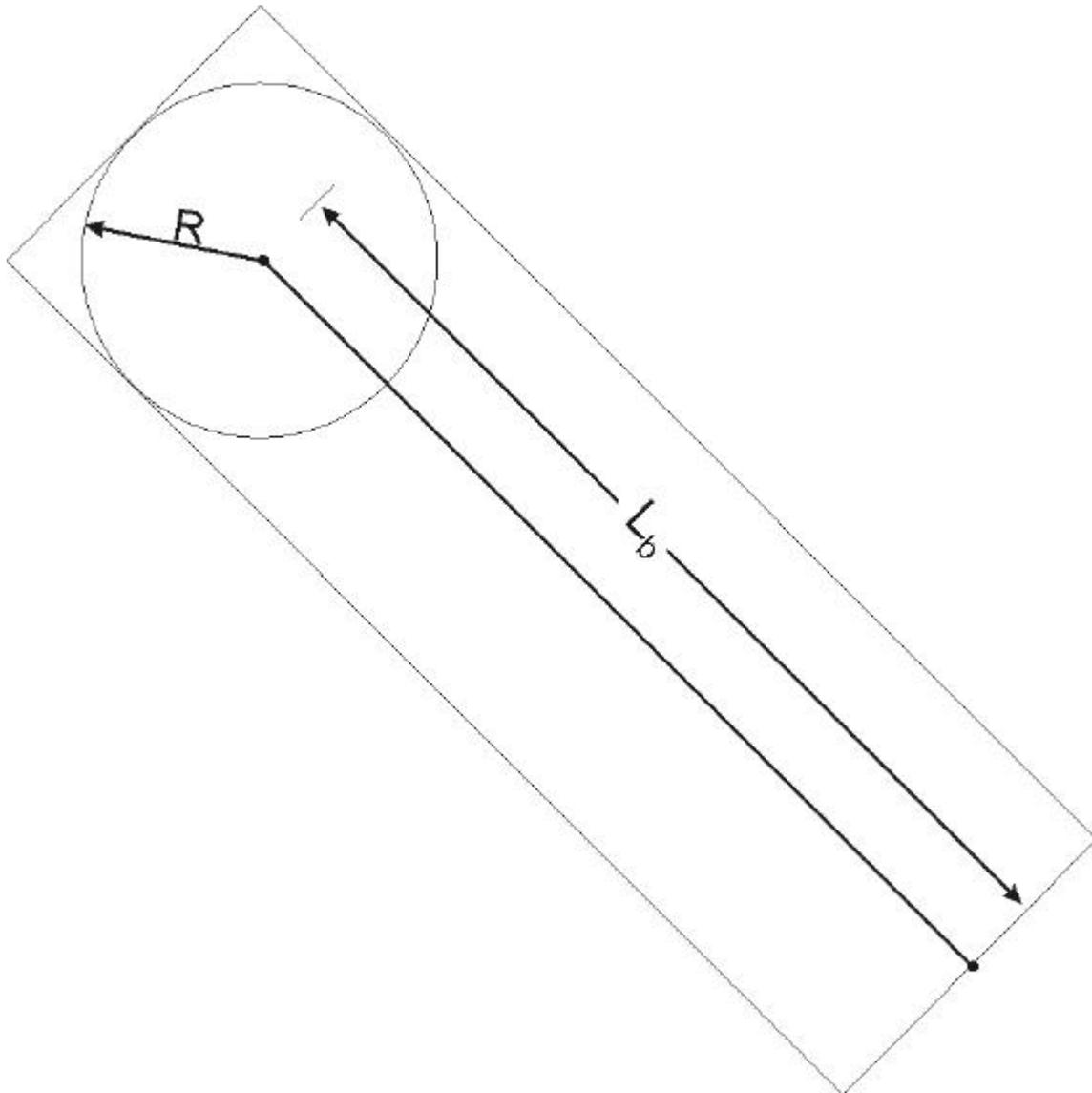


Figure L-6 – Search Area for a Line Datum (One End Extended)

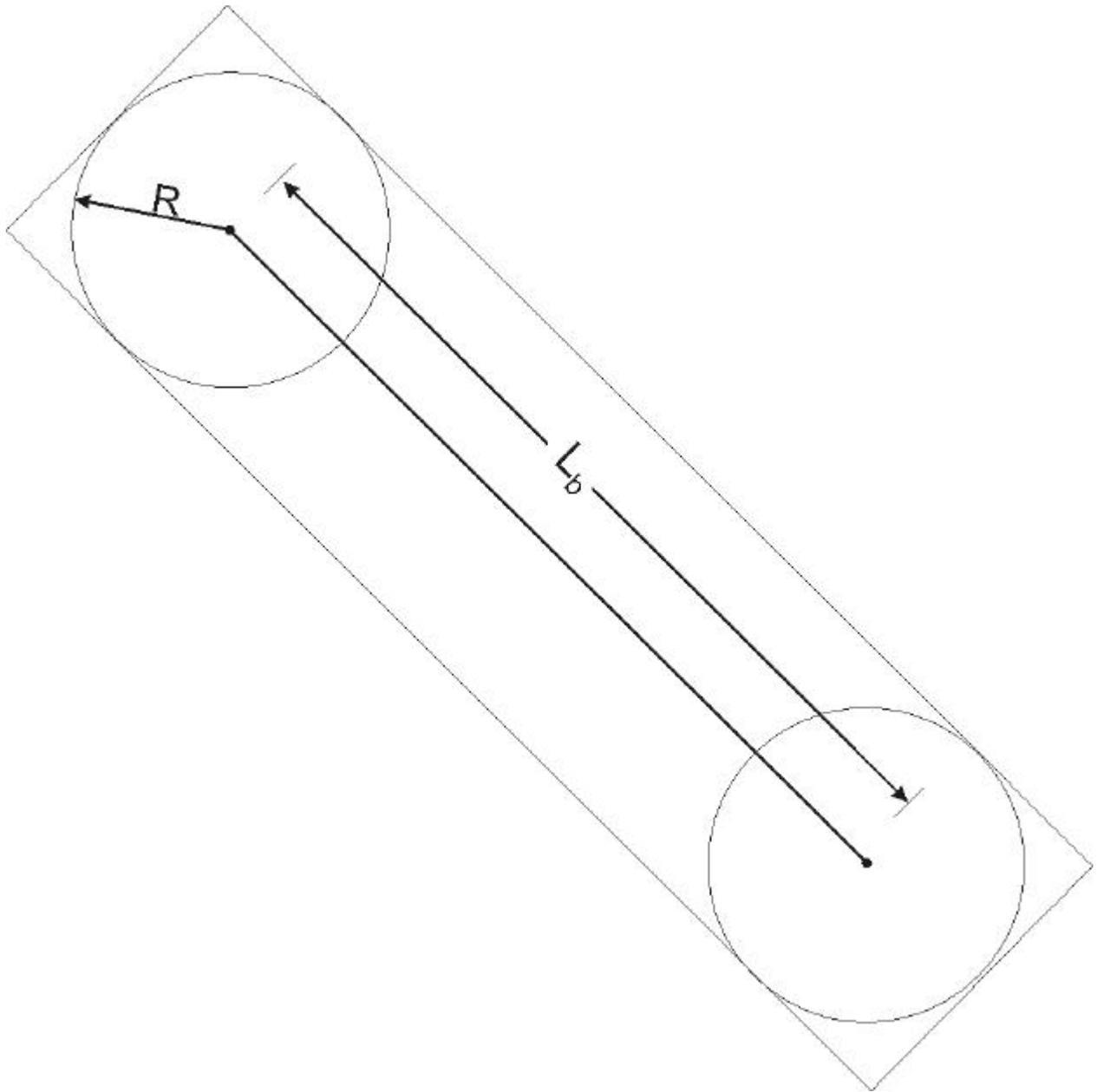


Figure L-7 – Search Area for a Line Datum (Both Ends Extended)

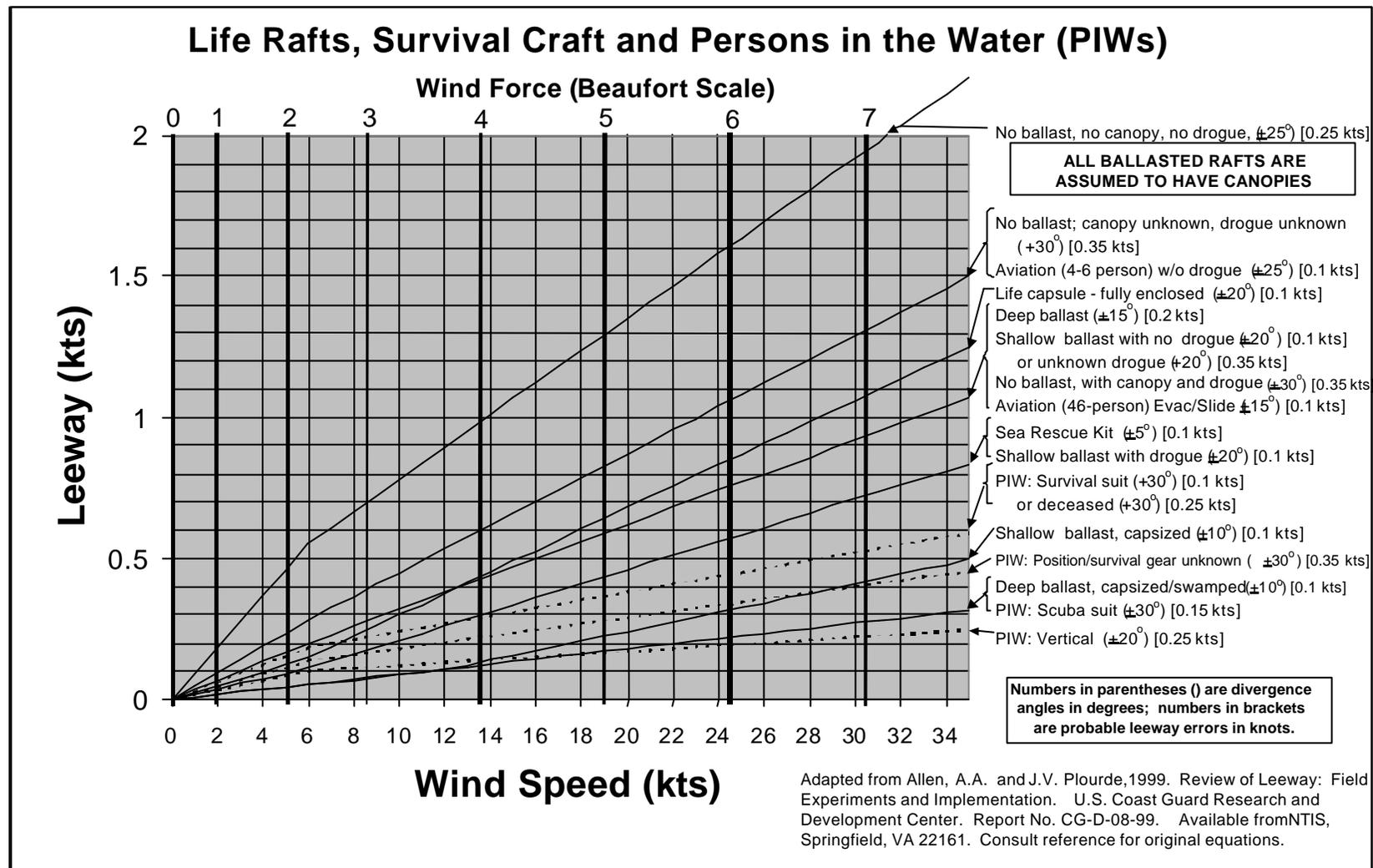
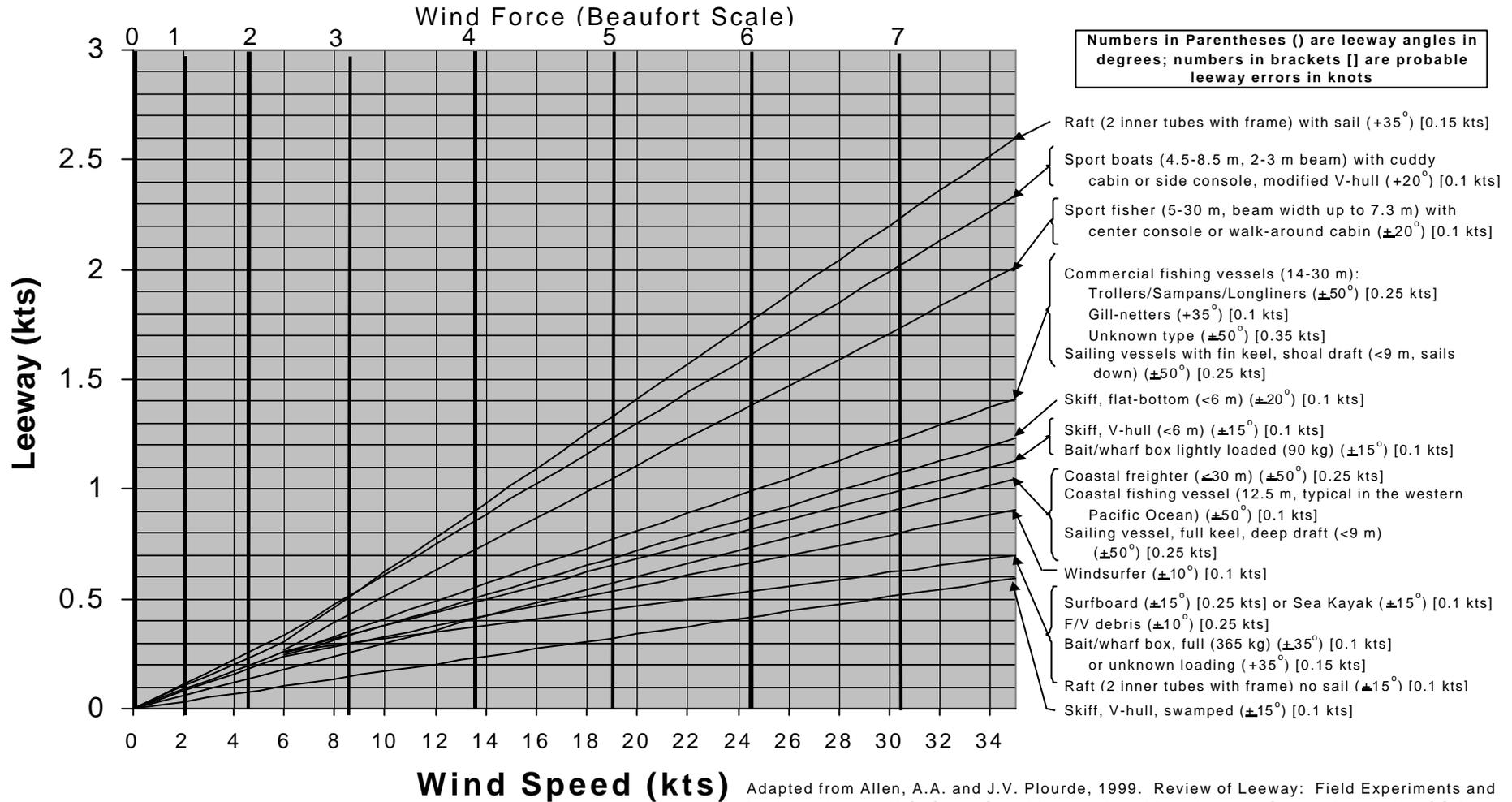


Figure N-2 – Leeway of Life Rafts, Survival Craft and Persons in the Water (PIWs)

### Power Vessels, Sailing Vessels and Person-powered Craft



Adapted from Allen, A.A. and J.V. Plourde, 1999. Review of Leeway: Field Experiments and Implementation. U.S. Coast Guard Research and Development Center, Report No. CG-D-08-99. Available from NTIS, Springfield, VA 22161. Consult reference for original equations.

Figure N-3 – Leeway for Power Vessels, Sailing Vessels and Person-powered Craft

Search Object (metres (feet))	Altitude 150 metres (500 feet) Visibility (km (NM))						Altitude 300 metres (1000 feet) Visibility (km (NM))						Altitude 600 metres (2000 feet) Visibility (km (NM))					
	1.9 (1)	5.6 (3)	9.3 (5)	18.5 (10)	27.8 (15)	>37.0 (>20)	1.9 (1)	5.6 (3)	9.3 (5)	18.5 (10)	27.8 (15)	>37.0 (>20)	1.9 (1)	5.6 (3)	9.3 (5)	18.5 (10)	27.8 (15)	>37.0 (>20)
Person in Water*	0.0 (0.0)	0.2 (0.1)	0.2 (0.1)	0.2 (0.1)	0.2 (0.1)	0.2 (0.1)	0.0 (0.0)	0.2 (0.1)	0.2 (0.1)	0.2 (0.1)	0.2 (0.1)	0.2 (0.1)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.2 (0.1)
Raft 1 person	0.7 (0.4)	1.7 (0.9)	2.2 (1.2)	3.0 (1.6)	3.3 (1.8)	3.3 (1.8)	0.7 (0.4)	1.7 (0.9)	2.2 (1.2)	3.0 (1.6)	3.3 (1.8)	3.3 (1.8)	0.4 (0.2)	1.5 (0.8)	2.2 (1.2)	3.0 (1.6)	3.3 (1.8)	3.3 (1.8)
Raft 4 person	0.9 (0.5)	2.2 (1.2)	3.0 (1.6)	4.1 (2.2)	4.8 (2.6)	5.2 (2.8)	0.9 (0.5)	2.2 (1.2)	3.1 (1.7)	4.3 (2.3)	4.8 (2.6)	5.4 (2.9)	0.6 (0.3)	2.2 (1.2)	3.1 (1.7)	4.3 (2.3)	5.0 (2.7)	5.6 (3.0)
Raft 6 person	0.9 (0.5)	2.6 (1.4)	3.5 (1.9)	5.0 (2.7)	5.9 (3.2)	6.5 (3.5)	0.9 (0.5)	2.6 (1.4)	3.7 (2.0)	5.2 (2.8)	5.9 (3.2)	6.5 (3.5)	0.6 (0.3)	2.6 (1.4)	3.7 (2.0)	5.2 (2.8)	6.1 (3.3)	6.7 (3.6)
Raft 8 person	1.1 (0.6)	2.8 (1.5)	3.7 (2.0)	5.2 (2.8)	6.1 (3.3)	6.9 (3.7)	0.9 (0.5)	2.8 (1.5)	3.9 (2.1)	5.4 (2.9)	6.3 (3.4)	7.0 (3.8)	0.6 (0.3)	2.8 (1.5)	3.9 (2.1)	5.6 (3.0)	6.7 (3.6)	7.2 (3.9)
Raft 10 person	1.1 (0.6)	3.0 (1.6)	4.1 (2.2)	5.7 (3.1)	6.7 (3.6)	7.4 (4.0)	0.9 (0.5)	3.0 (1.6)	4.1 (2.2)	5.9 (3.2)	6.9 (3.7)	7.6 (4.1)	0.6 (0.3)	3.0 (1.6)	4.3 (2.3)	6.1 (3.3)	7.2 (3.9)	7.8 (4.2)
Raft 15 person	1.1 (0.6)	3.1 (1.7)	4.3 (2.3)	6.1 (3.3)	7.4 (4.0)	8.1 (4.4)	1.1 (0.6)	3.1 (1.7)	4.4 (2.4)	6.5 (3.5)	7.6 (4.1)	8.3 (4.5)	0.6 (0.3)	3.1 (1.7)	4.6 (2.5)	6.7 (3.6)	8.0 (4.3)	8.7 (4.7)
Raft 20 person	1.1 (0.6)	3.3 (1.8)	4.8 (2.6)	7.0 (3.8)	8.5 (4.6)	9.4 (5.1)	1.1 (0.6)	3.3 (1.8)	5.0 (2.7)	7.2 (3.9)	8.7 (4.7)	9.6 (5.2)	0.7 (0.4)	3.3 (1.8)	5.0 (2.7)	7.4 (4.0)	9.1 (4.9)	10.0 (5.4)
Raft 25 person	1.1 (0.6)	3.5 (1.9)	5.0 (2.7)	7.6 (4.1)	9.3 (5.0)	10.4 (5.6)	1.1 (0.6)	3.5 (1.9)	5.2 (2.8)	7.8 (4.2)	9.4 (5.1)	10.6 (5.7)	0.7 (0.4)	3.5 (1.9)	5.4 (2.9)	8.0 (4.3)	9.8 (5.3)	10.9 (5.9)
Power Boat < 5 (15)	0.9 (0.5)	2.2 (1.2)	2.8 (1.5)	3.5 (1.9)	4.1 (2.2)	4.3 (2.3)	0.9 (0.5)	2.2 (1.2)	3.0 (1.6)	3.9 (2.1)	4.3 (2.3)	4.6 (2.5)	0.6 (0.3)	2.4 (1.3)	3.1 (1.7)	4.3 (2.3)	4.8 (2.6)	5.0 (2.7)
Power Boat 6 (20)	1.3 (0.7)	3.7 (2.0)	5.4 (2.9)	8.0 (4.3)	9.6 (5.2)	10.7 (5.8)	1.3 (0.7)	3.9 (2.1)	5.6 (3.0)	8.1 (4.4)	9.8 (5.3)	10.9 (5.9)	0.7 (0.4)	3.9 (2.1)	5.6 (3.0)	8.3 (4.5)	10.2 (5.5)	11.3 (6.1)
Power Boat 10 (33)	1.5 (0.8)	4.6 (2.5)	7.2 (3.9)	11.5 (6.2)	14.4 (7.8)	16.7 (9.0)	1.3 (0.7)	4.8 (2.6)	7.2 (3.9)	11.7 (6.3)	14.6 (7.9)	16.9 (9.1)	0.9 (0.5)	4.8 (2.6)	7.4 (4.0)	11.9 (6.4)	14.8 (8.0)	17.2 (9.3)
Power Boat 16 (53)	1.5 (0.8)	5.7 (3.1)	9.4 (5.1)	17.0 (9.2)	22.8 (12.3)	27.2 (14.7)	1.3 (0.7)	5.7 (3.1)	9.6 (5.2)	17.0 (9.2)	22.8 (12.3)	27.4 (14.8)	0.9 (0.5)	5.6 (3.0)	9.6 (5.2)	17.2 (9.3)	23.0 (12.4)	27.6 (14.9)
Power Boat 24 (78)	1.5 (0.8)	6.1 (3.3)	10.6 (5.7)	20.0 (10.8)	27.8 (15.0)	34.1 (18.4)	1.5 (0.8)	6.1 (3.3)	10.6 (5.7)	20.2 (10.9)	27.8 (15.0)	34.3 (18.5)	0.9 (0.5)	5.9 (3.2)	10.6 (5.7)	20.2 (10.9)	28.0 (15.1)	34.3 (18.5)
Sail Boat 5 (15)	1.3 (0.7)	3.5 (1.9)	5.0 (2.7)	7.2 (3.9)	8.7 (4.7)	9.6 (5.2)	1.1 (0.6)	3.5 (1.9)	5.2 (2.8)	7.4 (4.0)	8.9 (4.8)	10.0 (5.4)	0.7 (0.4)	3.5 (1.9)	5.2 (2.8)	7.8 (4.2)	9.3 (5.0)	10.4 (5.6)
Sail Boat 8 (26)	1.5 (0.8)	4.4 (2.4)	6.9 (3.7)	10.6 (5.7)	13.1 (7.1)	15.2 (8.2)	1.3 (0.7)	4.6 (2.5)	6.9 (3.7)	10.7 (5.8)	13.5 (7.3)	15.4 (8.3)	0.9 (0.5)	4.6 (2.5)	7.0 (3.8)	11.1 (6.0)	13.9 (7.5)	15.9 (8.6)
Sail Boat 12 (39)	1.5 (0.8)	5.6 (3.0)	9.1 (4.9)	15.4 (8.3)	20.9 (11.3)	25.0 (13.5)	1.3 (0.7)	5.6 (3.0)	9.1 (4.9)	15.9 (8.6)	21.1 (11.4)	25.0 (13.5)	0.9 (0.5)	5.6 (3.0)	9.1 (4.9)	16.1 (8.7)	21.1 (11.4)	25.2 (13.6)
Sail Boat 15 (49)	1.5 (0.8)	5.7 (3.1)	9.6 (5.2)	17.6 (9.5)	23.5 (12.7)	28.3 (15.3)	1.3 (0.7)	5.7 (3.1)	9.8 (5.3)	17.6 (9.5)	23.7 (12.8)	28.5 (15.4)	0.9 (0.5)	5.7 (3.1)	9.8 (5.3)	17.8 (9.6)	23.9 (12.9)	28.7 (15.5)
Sail Boat 21 (69)	1.5 (0.8)	5.9 (3.2)	10.2 (5.5)	19.3 (10.4)	26.1 (14.1)	32.0 (17.3)	1.5 (0.8)	5.9 (3.2)	10.4 (5.6)	19.3 (10.4)	26.3 (14.2)	32.0 (17.3)	0.9 (0.5)	5.9 (3.2)	10.4 (5.6)	19.4 (10.5)	26.5 (14.3)	32.2 (17.4)
Sail Boat 25 (83)	1.5 (0.8)	6.1 (3.3)	10.6 (5.7)	20.4 (11.0)	28.2 (15.2)	34.6 (18.7)	1.5 (0.8)	6.1 (3.3)	10.6 (5.7)	20.4 (11.0)	28.3 (15.3)	34.8 (18.8)	0.9 (0.5)	5.9 (3.2)	10.6 (5.7)	20.6 (11.1)	28.5 (15.4)	35.0 (18.9)
Ship 27-46 (90-150)	1.5 (0.8)	6.3 (3.4)	11.1 (6.0)	22.6 (12.2)	32.2 (17.4)	40.6 (21.9)	1.5 (0.8)	6.3 (3.4)	11.1 (6.0)	22.6 (12.2)	32.2 (17.4)	40.6 (21.9)	0.9 (0.5)	6.1 (3.3)	11.1 (6.0)	22.6 (12.2)	32.4 (17.5)	40.7 (22.0)
Ship 46-91 (150-300)	1.5 (0.8)	6.3 (3.4)	11.7 (6.3)	25.2 (13.6)	37.8 (20.4)	49.3 (26.6)	1.5 (0.8)	6.3 (3.4)	11.7 (6.3)	25.2 (13.6)	37.8 (20.4)	49.3 (26.6)	0.9 (0.5)	6.3 (3.4)	11.7 (6.3)	25.2 (13.6)	37.8 (20.4)	49.3 (26.6)
Ship > 91 (300)	1.5 (0.8)	6.5 (3.5)	11.9 (6.4)	26.5 (14.3)	40.9 (22.1)	55.2 (29.8)	1.5 (0.8)	6.5 (3.5)	11.9 (6.4)	26.5 (14.3)	41.1 (22.2)	55.2 (29.8)	1.1 (0.6)	6.3 (3.4)	11.9 (6.4)	26.5 (14.3)	41.1 (22.2)	55.2 (29.8)

\* For search altitudes of 150 metres (500 feet) only, the sweep width values for a person in water may be multiplied by 4, if it is known that the person is wearing a personal flotation device.

**Table N-5 – Sweep widths for helicopters (km (NM))**

Search Object (metres (feet))	Altitude 150 metres (500 feet) Visibility (km (NM))						Altitude 300 metres (1000 feet) Visibility (km (NM))						Altitude 600 metres (2000 feet) Visibility (km (NM))					
	1.9 (1)	5.6 (3)	9.3 (5)	18.5 (10)	27.8 (15)	>37.0 (>20)	1.9 (1)	5.6 (3)	9.3 (5)	18.5 (10)	27.8 (15)	>37.0 (>20)	1.9 (1)	5.6 (3)	9.3 (5)	18.5 (10)	27.8 (15)	>37.0 (>20)
Person in Water*	0.0 (0.0)	0.2 (0.1)	0.2 (0.1)	0.2 (0.1)	0.2 (0.1)	0.2 (0.1)	0.0 (0.0)	0.2 (0.1)	0.2 (0.1)	0.2 (0.1)	0.2 (0.1)	0.2 (0.1)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Raft 1 person	0.6 (0.3)	1.3 (0.7)	1.7 (0.9)	2.2 (1.2)	2.6 (1.4)	2.6 (1.4)	0.6 (0.3)	1.3 (0.7)	1.7 (0.9)	2.2 (1.2)	2.6 (1.4)	2.6 (1.4)	0.2 (0.1)	1.1 (0.6)	1.7 (0.9)	2.2 (1.2)	2.6 (1.4)	2.6 (1.4)
Raft 4 person	0.7 (0.4)	1.9 (1.0)	2.4 (1.3)	3.3 (1.8)	3.7 (2.0)	4.1 (2.2)	0.6 (0.3)	1.9 (1.0)	2.4 (1.3)	3.3 (1.8)	3.9 (2.1)	4.3 (2.3)	0.4 (0.2)	1.7 (0.9)	2.4 (1.3)	3.5 (1.9)	4.1 (2.2)	4.3 (2.3)
Raft 6 person	0.7 (0.4)	2.0 (1.1)	2.8 (1.5)	4.1 (2.2)	4.6 (2.5)	5.2 (2.8)	0.7 (0.4)	2.0 (1.1)	3.0 (1.6)	4.1 (2.2)	4.8 (2.6)	5.2 (2.8)	0.4 (0.2)	2.0 (1.1)	3.0 (1.6)	4.3 (2.3)	5.0 (2.7)	5.4 (2.9)
Raft 8 person	0.7 (0.4)	2.2 (1.2)	3.0 (1.6)	4.3 (2.3)	5.0 (2.7)	5.4 (2.9)	0.7 (0.4)	2.2 (1.2)	3.1 (1.7)	4.4 (2.4)	5.2 (2.8)	5.6 (3.0)	0.4 (0.2)	2.2 (1.2)	3.1 (1.7)	4.6 (2.5)	5.4 (2.9)	5.9 (3.2)
Raft 10 person	0.7 (0.4)	2.2 (1.2)	3.1 (1.7)	4.6 (2.5)	5.4 (2.9)	5.9 (3.2)	0.7 (0.4)	2.4 (1.3)	3.3 (1.8)	4.8 (2.6)	5.6 (3.0)	6.1 (3.3)	0.4 (0.2)	2.2 (1.2)	3.3 (1.8)	5.0 (2.7)	5.7 (3.1)	6.5 (3.5)
Raft 15 person	0.9 (0.5)	2.4 (1.3)	3.5 (1.9)	5.0 (2.7)	6.1 (3.3)	6.7 (3.6)	0.7 (0.4)	2.6 (1.4)	3.7 (2.0)	5.2 (2.8)	6.3 (3.4)	6.9 (3.7)	0.4 (0.2)	2.6 (1.4)	3.7 (2.0)	5.6 (3.0)	6.5 (3.5)	7.2 (3.9)
Raft 20 person	0.9 (0.5)	2.8 (1.5)	3.9 (2.1)	5.9 (3.2)	7.0 (3.8)	7.8 (4.2)	0.7 (0.4)	2.8 (1.5)	4.1 (2.2)	5.9 (3.2)	7.2 (3.9)	8.0 (4.3)	0.7 (0.4)	2.8 (1.5)	4.1 (2.2)	6.3 (3.4)	7.4 (4.0)	8.3 (4.5)
Raft 25 person	0.9 (0.5)	3.0 (1.6)	4.3 (2.3)	6.3 (3.4)	7.6 (4.1)	8.5 (4.6)	0.7 (0.4)	3.0 (1.6)	4.3 (2.3)	6.5 (3.5)	7.8 (4.2)	8.7 (4.7)	0.6 (0.3)	3.0 (1.6)	4.4 (2.4)	6.7 (3.6)	8.1 (4.4)	9.1 (4.9)
Power Boat < 5 (15)	0.7 (0.4)	1.7 (0.9)	2.2 (1.2)	2.8 (1.5)	3.1 (1.7)	3.3 (1.8)	0.7 (0.4)	1.9 (1.0)	2.4 (1.3)	3.1 (1.7)	3.3 (1.8)	3.7 (2.0)	0.4 (0.2)	1.9 (1.0)	2.4 (1.3)	3.3 (1.8)	3.7 (2.0)	4.1 (2.2)
Power Boat 6 (20)	0.9 (0.5)	3.1 (1.7)	4.4 (2.4)	6.7 (3.6)	8.0 (4.3)	8.9 (4.8)	0.9 (0.5)	3.1 (1.7)	4.6 (2.5)	6.9 (3.7)	8.1 (4.4)	9.3 (5.0)	0.6 (0.3)	3.1 (1.7)	4.6 (2.5)	7.0 (3.8)	8.5 (4.6)	9.4 (5.1)
Power Boat 10 (33)	1.1 (0.6)	3.9 (2.1)	6.1 (3.3)	9.8 (5.3)	12.4 (6.7)	14.3 (7.7)	0.9 (0.5)	4.1 (2.2)	6.3 (3.4)	10.0 (5.4)	12.6 (6.8)	14.4 (7.8)	0.6 (0.3)	4.1 (2.2)	6.3 (3.4)	10.2 (5.5)	12.8 (6.9)	14.8 (8.0)
Power Boat 16 (53)	1.1 (0.6)	5.0 (2.7)	8.3 (4.5)	15.0 (8.1)	20.2 (10.9)	24.3 (13.1)	1.1 (0.6)	5.0 (2.7)	8.3 (4.5)	15.2 (8.2)	20.2 (10.9)	24.3 (13.1)	0.7 (0.4)	4.8 (2.6)	8.3 (4.5)	15.4 (8.3)	20.4 (11.0)	24.6 (13.3)
Power Boat 24 (78)	1.1 (0.6)	5.2 (2.8)	9.3 (5.0)	18.1 (9.8)	25.0 (13.5)	30.9 (16.7)	1.1 (0.6)	5.2 (2.8)	9.4 (5.1)	18.1 (9.8)	25.2 (13.6)	30.9 (16.7)	0.7 (0.4)	5.2 (2.8)	9.3 (5.0)	18.1 (9.8)	25.2 (13.6)	31.1 (16.8)
Sail Boat 5 (15)	0.9 (0.5)	3.0 (1.6)	4.1 (2.2)	5.9 (3.2)	7.2 (3.9)	8.0 (4.3)	0.9 (0.5)	3.0 (1.6)	4.3 (2.3)	6.1 (3.3)	7.4 (4.0)	8.1 (4.4)	0.6 (0.3)	3.0 (1.6)	4.3 (2.3)	6.5 (3.5)	7.6 (4.1)	8.3 (4.5)
Sail Boat 8 (26)	1.1 (0.6)	3.7 (2.0)	5.7 (3.1)	9.1 (4.9)	11.3 (6.1)	13.0 (7.0)	0.9 (0.5)	3.9 (2.1)	5.9 (3.2)	9.3 (5.0)	11.5 (6.2)	13.1 (7.1)	0.6 (0.3)	3.9 (2.1)	6.1 (3.3)	9.6 (5.2)	11.9 (6.4)	13.5 (7.3)
Sail Boat 12 (39)	1.1 (0.6)	4.8 (2.6)	8.0 (4.3)	14.1 (7.6)	18.5 (10.0)	22.0 (11.9)	1.1 (0.6)	4.8 (2.6)	8.0 (4.3)	14.1 (7.6)	20.2 (10.9)	22.2 (12.0)	0.7 (0.4)	4.6 (2.5)	8.0 (4.3)	14.3 (7.7)	18.7 (10.1)	22.4 (12.1)
Sail Boat 15 (49)	1.1 (0.6)	5.0 (2.7)	8.5 (4.6)	15.6 (8.4)	20.9 (11.3)	25.4 (13.7)	1.1 (0.6)	5.0 (2.7)	8.5 (4.6)	15.7 (8.5)	21.1 (11.4)	25.4 (13.7)	0.7 (0.4)	5.0 (2.7)	8.5 (4.6)	15.9 (8.6)	21.3 (11.5)	25.7 (13.9)
Sail Boat 21 (69)	1.1 (0.6)	5.2 (2.8)	9.1 (4.9)	17.2 (9.3)	23.5 (12.7)	28.7 (15.5)	1.1 (0.6)	5.2 (2.8)	9.1 (4.9)	17.2 (9.3)	23.7 (12.8)	28.9 (15.6)	0.7 (0.4)	5.0 (2.7)	9.1 (4.9)	17.4 (9.4)	23.9 (12.9)	29.1 (15.7)
Sail Boat 25 (83)	1.1 (0.6)	5.2 (2.8)	9.4 (5.1)	18.3 (9.9)	25.4 (13.7)	31.5 (17.0)	1.1 (0.6)	5.2 (2.8)	9.4 (5.1)	18.3 (9.9)	25.6 (13.8)	31.5 (17.0)	0.7 (0.4)	5.2 (2.8)	9.4 (5.1)	18.5 (10.0)	25.7 (13.9)	31.7 (17.1)
Ship 27-46 (90-150)	1.1 (0.6)	5.4 (2.9)	10.0 (5.4)	20.6 (11.1)	29.4 (15.9)	37.2 (20.1)	1.1 (0.6)	5.4 (2.9)	10.0 (5.4)	20.6 (11.1)	29.4 (15.9)	37.2 (20.1)	0.7 (0.4)	5.4 (2.9)	10.0 (5.4)	20.6 (11.1)	29.6 (16.0)	37.2 (20.1)
Ship 46-91 (150-300)	1.1 (0.6)	5.6 (3.0)	10.6 (5.7)	23.2 (12.5)	35.0 (18.9)	45.7 (24.7)	1.1 (0.6)	5.6 (3.0)	10.6 (5.7)	23.2 (12.5)	35.0 (18.9)	45.7 (24.7)	0.7 (0.4)	5.6 (3.0)	10.6 (5.7)	23.2 (12.5)	35.0 (18.9)	45.7 (24.7)
Ship > 91 (300)	1.3 (0.7)	5.6 (3.0)	10.7 (5.8)	24.4 (13.2)	38.2 (20.6)	51.7 (27.9)	1.1 (0.6)	5.6 (3.0)	10.7 (5.8)	24.4 (13.2)	38.2 (20.6)	51.7 (27.9)	0.9 (0.5)	5.6 (3.0)	10.7 (5.8)	24.4 (13.2)	38.3 (20.7)	51.7 (27.9)

\* For search altitudes of 150 metres (500 feet only), the sweep width values for a person in water may be multiplied by 4, if it is known that the person is wearing a personal flotation device.

**Table N-6 – Sweep widths for fixed-wing aircraft (km (NM))**

Weather: Winds km/h (kt) or seas m (ft)	Search Object	
	Person in water, raft or boat < 10 m (33 ft)	Other search objects
Winds 0-28 km/h (0-15 kt) or seas 0-1 m (0-3ft)	1.0	1.0
Winds 28-46 km/h (15-25 kt) or seas 1-1.5 m (3-5ft)	0.5	0.9
Winds > 46 km/h (> 25 kt) or seas > 1.5 m (> 5 ft)	0.25	0.9

Table N-7 Weather correction factors for all types of search facilities

Search Object	Fixed Wing Speed km/h (kts)			Helicopter Speed km/h (kts)			
	£ 275 (£ 150)	330 (180)	385 (210)	£ 110 (£ 60)	165 (90)	220 (120)	255 (140)
Person in Water	1.2	1.0	0.9	1.5	1.0	0.8	0.7
Raft - 1-4 Person	1.1	1.0	0.9	1.3	1.0	0.9	0.8
Raft - 6-25 Person	1.1	1.0	0.9	1.2	1.0	0.9	0.8
Power Boat - < 8 m (< 25 ft)	1.1	1.0	0.9	1.2	1.0	0.9	0.8
Power Boat - 10 m (33 ft)	1.1	1.0	0.9	1.1	1.0	0.9	0.9
Power Boat - 16 m (53 ft)	1.1	1.0	1.0	1.1	1.0	0.9	0.9
Power Boat - 24 m (78 ft)	1.1	1.0	1.0	1.1	1.0	1.0	0.9
Sail Boat - < 8 m (< 25 ft)	1.1	1.0	0.9	1.2	1.0	0.9	0.9
Sail Boat - 12 m (39 ft)	1.1	1.0	1.0	1.1	1.0	0.9	0.9
Sail Boat - 25 m (83 ft)	1.1	1.0	1.0	1.1	1.0	1.0	0.9
Ship - > 27 m (> 90 ft)	1.0	1.0	1.0	1.1	1.0	1.0	0.9

Table N-8 – Speed (velocity) correction factors for helicopter and fixed wing aircraft search facilities

## Appendix P (to Volume II)

### Functional Characteristics to Consider with Computer-based Search Planning Aids

#### Overview

The computer software, hereinafter referred to as the search planning model, should be designed to accept all inputs that the SAR Co-ordinator can reasonably be expected to use in search planning and present the calculated results to the Co-ordinator as useable information in the form of an optimal search plan, useful statistics and values important to the search planning process. It should not simply produce a mass of data outputs. The desirable functional characteristics of the search planning model should include, but should not be limited to those in the following list. The model should perform the following functions:

- Accept and integrate various environmental data from multiple sources, together with their estimated error and variability patterns;
- Simulate the effects of the environment on search object status and motion, sensor performance and the survivors.
- Use appropriate sampling techniques for simulating possible search object movements (e.g. drift), and determining the area of containment;
- Have the flexibility to develop updated search plans based on new information or assumptions made by the search planner;
- Have the ability to allow for time uncertainty and/or position uncertainty of the initial distress location;
- Simulate hazards, possible encounters between the missing craft and the hazards, and the probabilities that such encounters would result in a distress incident;
- Have the ability to generate initial probability density distributions using the previous two features together;
- Be capable of simulating post-distress changes (state changes) in the status of distressed persons such as abandoning a vessel into a life raft;
- Be capable of predicting the survivability of distressed persons based on selectable scenarios and when computing optimal effort allocations;
- Generate valid probability density distributions of possible search object locations based on post-distress search object trajectories using low to high resolution<sup>2</sup> environmental data, as available (high resolution data is always preferred);
- Be capable of handling multiple scenarios simultaneously which includes the ability to compare the scenarios and assign weighting factors to them;
- Produce an operationally feasible search plan that maximises the probability of finding the distressed persons alive with the available search facilities – i.e., produce an optimal search plan for the situation at hand. Factors to consider are the possible (weighted) scenarios, the dynamic probability density distribution of search object locations, survivor state changes, survival times, environmental parameters, search facility characteristics (number, type, location, endurance, sensors, etc.), previous search results, etc. Both tactical (myopic, day-to-day or sortie-to-sortie) and strategic optimisation (when resource availability can be predicted with reasonable certainty) should be available;

---

<sup>2</sup> High resolution data is data on a small spatial (e.g. 0.1 x 0.1 degree or 6 NM x 6 NM at the equator) and temporal (e.g. every 3 hours) grid. Low resolution data would be on larger grids (e.g., 1 x 1 degree x 24 hours or greater).

- Be able to properly evaluate search results (in the computational sense), including both positive (e.g., debris sightings) and negative (no sightings of search object) aspects. It should perform detailed updates of the dynamic probability density distributions of the possible search object locations based on actual sortie tracks and reports of sensor performance;
- Make proper use of previous search results when computing optimal plans for subsequent searches;
- Correctly simulate the effects of the relative motion between moving search objects and moving search facilities;
- Compute and display estimates of search effectiveness in the form of POS values for sorties and the cumulative POS value for all searching done to date;
- Be capable of processing and re-evaluating new (including late-arriving) information such as update of last known position and/or distress time to produce an updated optimal search plan;
- Consideration should be given to the man-machine interface so that the information generated by the computer-based tool and database would be useful to the search planner. The model should also be capable of displaying large volumes of information in ways that promote rapid assimilation. The model should contain or be integrated with appropriate geographical displays and useful tools for describing search sub-areas, generating search patterns, communicating search plans to search facilities, etc.; and,
- Finally, the software of such a model must be developed using sound software engineering principles to keep life-cycle costs down, maximise reliability, provide for ease of making future improvements, and have it operate with as many hardware platforms and operating systems as possible.

**Appendix Q (to Volume II)  
Sample Problem**

**F/V Sample – Alpha Search**

**Alpha Search Scenario**

- 1 On 25 January 2000 at 2145Z, the F/V Sample broadcast a distress radio call. The captain reported the vessel's engines were inoperable and the vessel was taking on water, but the vessel was not in immediate danger of sinking. However, the captain requested assistance. The vessel's reported DR position at 2145 Z was given as 37-10N, 065-45W. This DR position was based on a celestial fix at 250100Z JAN 00 in position 38-57N, 068-54W. Communications were lost after this initial call for assistance.
- 2 A British Airways flight transiting the area while en route to Bermuda at 261100Z JAN 00 failed to sight the F/V Sample. Based on enquiries about resource availability, the earliest time at which a search can commence is 261630Z JAN 00. A search is to be planned for this commence search time.

**Wind Information**

**3 Observed and forecast wind data:**

Date	Time	°T/KTS	Date	Time	°T/KTS
26 JAN	0000Z	175/32	27 JAN	0000Z	200/32
	0600Z	190/30		0600Z	195/30
	1200Z	210/35		1200Z	195/30
	1800Z	205/37		1800Z	200/28

**Vessel Description**

- 4 The F/V Sample is a 75-foot eastern rigged side trawler, with a black steel hull and a white superstructure.

**Search Facilities**

- 5 Two four-engine fixed wing aircraft search facilities are available with GPS navigation systems.

Aircraft Type	Speed	On Scene Endurance	Crew Fatigue
C-130 Hercules	180 knots	3.00 hours	Normal
P-3 Orion	200 knots	4.00 hours	Normal

**Search Conditions**

- 6 On scene weather for 26 January 2000:

Meteorological Visibility	5 NM	Ceiling	1500 feet
Winds	210°T/35 knots	Seas	3-5 feet
Sunrise	1100Z	Sunset	2200Z

**Datum Worksheet  
For Computing Drift in the Marine Environment**

Case Title: F/V SAMPLE Case Number: 00-001 Date: 26 JAN 2000

Planner's Name: SAR SCHOOL Datum Number: 1 Search Plan: A B C A

Search Object: Medium displacement fishing vessel

**A. Starting Position for this Drift Interval**

- |                                     |  |                         |
|-------------------------------------|--|-------------------------|
| 1. Type of Position<br>(Circle one) | Last Known Position<br>Estimated Incident Position<br>Previous Datum | LKP<br><u>EIP</u><br>PD |
| 2. Position Date/Time               | <u>252145Z JAN 2000</u>  |                         |
| 3. Latitude, Longitude of Position  | <u>37-10 N/S</u>   | <u>065-45 W/E</u>       |

**B. Datum Time**

- |                              |                         |
|------------------------------|-------------------------|
| 1. Commence Search Date/Time | <u>261630Z JAN 2000</u> |
| 2. Drift Interval            | <u>18.75</u> Hours      |

**C. Average Surface Wind (ASW)  
(Attach Average Surface Wind (ASW) Worksheet)**

- |  |               |                  |
|--|---------------|------------------|
| 1. Average Surface Wind (ASW)  | <u>194</u> °T | <u>31.72</u> KTS |
| 2. Probable Error of Drift Velocity due to<br>Probable Error of Average Surface Wind (ASWDV <sub>e</sub> ) |               | <u>0.3</u> KTS   |

**D. Total Water Current (TWC)  
(Attach Total Water Current (TWC) Worksheet)**

- |   |               |                 |
|---|---------------|-----------------|
| 1. Total Water Current (TWC)                              | <u>057</u> °T | <u>1.86</u> KTS |
| 2. Probable Total Water Current Error (TWC <sub>e</sub> ) |               | <u>0.42</u> KTS |

**E. Leeway (*LW*)**

(Attach **Leeway (*LW*) Worksheet**)

- |  |               |                |
|--|---------------|----------------|
| 1. Left of down wind                               | <u>324</u> °T | <u>1.3</u> KTS |
| 2. Right of down wind                              | <u>064</u> °T | <u>1.3</u> KTS |
| 3. Probable Leeway Error ( <i>LW<sub>e</sub></i> ) |               | <u>0.3</u> KTS |

**F. Total Surface Drift**

Use a Manoeuvring Board or Calculator to add Total Water Current and Leeway vectors. (See **Figure K-1a.**)

- |  |                     |                      |  |
|--|---------------------|----------------------|--|
|  | (left of down wind) | (right of down wind) |  |
| 1. Drift Directions  | <u>021</u> °T       | <u>060</u> °T        |  |
| 2. Drift Speeds  | <u>2.21</u> KTS     | <u>3.15</u> KTS      |  |
| 3. Drift Distances ( <b>line F.2</b> × <b>line B.2</b> )         | <u>41.49</u> NM     | <u>59.14</u> NM      |  |
| 4. Total Probable Drift Velocity Error ( <i>DV<sub>e</sub></i> ) |                     | <u>0.60</u> KTS      |  |
- $$\left( DV_e = \sqrt{ASWDV_e^2 + TWC_e^2 + LW_e^2} \right)$$

**G. Datum Positions and Divergence Distance**

Using a Chart, Universal Plotting Sheet or Calculator, determine the datum positions and divergence distance (*DD*) (See **Figure K-1b.**)

- |   |                    |                     |
|---|--------------------|---------------------|
| 1. Latitude, Longitude (left of down wind)  | <u>37-48.7 N/S</u> | <u>065-26.3 W/E</u> |
| 2. Latitude, Longitude (right of down wind) | <u>37-39.6 N/S</u> | <u>064-40.5 W/E</u> |
| 3. Divergence Distance ( <i>DD</i> )        |                    | <u>37.5</u> NM      |

**H. Total Probable Error of Position (*E*) and Separation Ratio (*SR*)**

(Attach **Total Probable Error of Position (*E*) Worksheet**)

- |   |                                |
|---|--------------------------------|
| 1. Total Probable Error of Position Squared ( <i>E</i> <sup>2</sup> ) | <u>1,002.7</u> NM <sup>2</sup> |
| 2. Total Probable Error of Position ( <i>E</i> )                      | <u>31.67</u> NM                |
| 3. Separation Ratio ( <i>SR</i> = <i>DD</i> / <i>E</i> )              | <u>1.18</u>                    |
| 4. Go to the <b>Total Available Search Effort Worksheet.</b>          |                                |

### Average Surface Wind (ASW) Worksheet

Case Title: F/V SAMPLE Case Number: 00-001 Date: 26 JAN 2000

Planner's Name: SAR SCHOOL Datum Number: 1 Search Plan: A B C A

#### A. Average Surface Wind

##### 1. Surface Wind Data

Time of Observation	Time Interval	Number Wind of Hours Direction			Wind Speed (A × C)	Wind Contribution
		(A)	(B)	(C)		
<u>260000Z</u>	<u>2145 - 0300</u>	<u>5.25</u>	<u>175</u>	<u>°T</u>	<u>32</u> KTS	<u>168</u> NM
<u>260600Z</u>	<u>0300 - 0900</u>	<u>6.00</u>	<u>190</u>	<u>°T</u>	<u>30</u> KTS	<u>180</u> NM
<u>261200Z</u>	<u>0900 - 1500</u>	<u>6.00</u>	<u>210</u>	<u>°T</u>	<u>35</u> KTS	<u>210</u> NM
<u>261800Z</u>	<u>1500 - 1630</u>	<u>1.50</u>	<u>205</u>	<u>°T</u>	<u>37</u> KTS	<u>55.5</u> NM
_____	_____ - _____	_____	_____	_____ °T	_____ KTS	_____ NM
_____	_____ - _____	_____	_____	_____ °T	_____ KTS	_____ NM
_____	_____ - _____	_____	_____	_____ °T	_____ KTS	_____ NM
_____	_____ - _____	_____	_____	_____ °T	_____ KTS	_____ NM
	Total Hours	<u>18.75</u> (D)	Vector Sum of Contributions		<u>194</u> °T (E)	<u>594.76</u> NM (F)

2. Average Surface Wind (ASW) [(E)°T (F/D) KTS] 194 °T 31.72 KTS

#### B. Probable Error

1. Probable Error of the Average Surface Wind (ASW<sub>e</sub>) 5.0 KTS

2. Probable Error of Drift Velocity due to Probable Error of the Average Surface Wind (ASWDV<sub>e</sub>) 0.3 KTS

Go to **Part C** on the **Datum Worksheet**.

**Total Water Current (TWC) Worksheet**

Case Title: **F/V SAMPLE** Case Number: **00-001** Date: **26 JAN 2000**

Planner's Name: **SAR SCHOOL** Datum Number: **1** Search Plan: A B C **A**

**A. Observed Total Water Current (TWC)**

1. Source (datum marker buoy (DMB), debris, oil) \_\_\_\_\_
2. Observed Set/Drift \_\_\_\_\_ °T \_\_\_\_\_ KTS
3. Probable Error of Observation ( $TWC_e$ ) \_\_\_\_\_ KTS
4. Go to **Part D** on the **Datum Worksheet**.

**B. Computed Total Water Current**

1. Tidal Current (TC)
  - a. Source (tidal current tables, local knowledge) \_\_\_\_\_
  - b. Tidal Current (TC) Set/Drift \_\_\_\_\_ °T \_\_\_\_\_ KTS  
(Attach any tidal current computations)
  - c. Probable Error of Tidal Current ( $TC_e$ ) \_\_\_\_\_ KTS
2. Sea Current (SC)
  - a. Source (Atlas, Pilot Chart, etc.) **NOOSP NA6 1400**
  - b. Sea Current (SC) Set/Drift **075** °T **0.8** KTS
  - c. Probable Error of Sea Current ( $SC_e$ ) **0.3** KTS
3. Wind Current (WC)  
(Attach **Wind Current Worksheet**)
  - a. Wind Current (WC) Set/Drift **044** °T **1.13** KTS
  - b. Probable Error of Wind Current ( $WC_e$ ) **0.3** KTS

4. Other Water Current (*OWC*)
- a. Source (local knowledge, previous drifts, etc.) \_\_\_\_\_
- b. Other Water Current (*OWC*) Set/Drift \_\_\_\_\_ °T \_\_\_\_\_ KTS
- c. Probable Error of Other Water Current (*OWC<sub>e</sub>*) \_\_\_\_\_ KTS
5. Computed Total Water Current (*TWC*) Set/Drift \_\_\_\_\_ **057** °T \_\_\_\_\_ **1.86** KTS
6. Computed Probable Total Water Current Error (*TWC<sub>e</sub>*) \_\_\_\_\_ **0.42** KTS  

$$\left(TWC_e = \sqrt{TC_e^2 + SC_e^2 + WC_e^2 + OWC_e^2}\right)$$
7. Go to **Part D** on the **Datum Worksheet**.

**Wind Current (WC) Worksheet**

Case Title: **F/V SAMPLE** Case Number: **00-001** Date: **26 JAN 2000**

Planner's Name: **SAR SCHOOL** Datum Number: **1** Search Plan: A B C **A**

**Wind Current (WC)**

1. Average Surface Wind (ASW) **194** °T **31.72** KTS  
(from **Datum Worksheet, line C.1**)
  
2. Down Wind Direction (ASW direction ± 180°) **014** °T
  
3. Wind Current Drift **1.13** KTS  
(from **Figure N-1**)
  
4. Divergence of Wind Current ± **+30**°  
(from **Figure N-1**)
  
5. Wind Current Set **044** °T  
(Down wind direction ± Divergence of Wind Current)  
(Add Divergence in northern hemisphere, subtract in southern hemisphere.)
  
6. Wind Current (WC) Set/Drift **044** °T **1.13** KTS
  
7. Probable Error of Wind Current (WC<sub>e</sub>) **0.3** KTS
  
8. Go to **line B.3** on the **Total Water Current (TWC) Worksheet**.

### Leeway (*LW*) Worksheet

Case Title: F/V SAMPLE Case Number: 00-001 Date: 26 JAN 2000

Planner's Name: SAR SCHOOL Datum Number: 1 Search Plan: A B C A

Search Object: Medium displacement fishing vessel

1. Average Surface Wind (*ASW*) 194 °T 31.72 KTS  
(from **Datum Worksheet, line C.1**)
2. Down Wind Direction (*ASW* direction  $\pm 180^\circ$ ) 014 °T
3. Leeway Speed 1.3 KTS  
(from **Figure N-2** or **N-3**)
4. Leeway Divergence Angle  $\pm$  50 °  
(from **Figure N-2** or **N-3**)
5. Leeway Directions
  - a. Left of down wind (**line 2** – **line 4**) 324 °T
  - b. Right of down wind (**line 2** + **line 4**) 064 °T
6. Leeway (*LW*)
  - a. Left of down wind 324 °T 1.3 KTS
  - b. Right of down wind 064 °T 1.3 KTS
7. Probable Leeway Error (*LW<sub>e</sub>*) 0.3 KTS  
(from **Figure N-2** or **N-3**)
8. Go to **Part E** on the **Datum Worksheet**.

**Total Probable Error of Position (E) Worksheet  
For Land and Marine Environments**

Case Title: F/V SAMPLE Case Number: 00-001 Date: 26 JAN 2000

Planner's Name: SAR SCHOOL Datum Number: 1 Search Plan: A B C A

**A. Probable Distress Incident/Initial Position Error (X)**

(Go to **line 1** to compute probable error of the distress incident position. Go to **line 6** if the starting position for this drift interval is a previous datum.)

1. Navigational Fix Error 2.0 NM  
(from **Table N-1** or **N-2**)
2. Dead Reckoning (DR) Error Rate 15 %  
(from **Table N-3**)
3. DR Distance Since Last Fix 184 NM
4. DR Navigational Error (**line A.2** × **line A.3**) 27.6 NM
5. Glide Distance (if aircraft/parachute descent heading is unknown) \_\_\_\_\_ NM
6. Probable Initial Position Error (X) 29.6 NM  
(X = **line A.1** + **line A.4** + **line A.5**) or  
(X = Total Probable Error of Position from **line H.2** of previous **Datum Worksheet**.)

**B. Total Probable Drift Error (D<sub>e</sub>)**

1. Drift Interval 18.75 Hours  
(from **line B.2** of the **Datum Worksheet**)
2. Probable Drift Velocity Error (DV<sub>e</sub>) 0.6 KTS  
(from **line F.4** of the **Datum Worksheet**)
3. Total Probable Drift Error (D<sub>e</sub>) 11.25 NM  
(D<sub>e</sub> = **line B.1** × **line B.2**)

**C. Probable Search Facility Position Error (*Y*)**

- |   |               |
|---|---------------|
| 1. Navigational Fix Error<br>(from <b>Table N-1</b> or <b>N-2</b> )   | <u>0.1</u> NM |
| 2. Dead Reckoning (DR) Error Rate<br>(from <b>Table N-3</b> )   | _____ %       |
| 3. DR Distance Since Last Fix   | _____ NM      |
| 4. DR Navigational Error<br>( <b>line C.2</b> × <b>line C.3</b> )   | _____ NM      |
| 5. Probable Search Facility Position Error ( <i>Y</i> )<br>( <i>Y</i> = <b>line C.1</b> + <b>line C.4</b> ) | <u>0.1</u> NM |

**D. Total Probable Error of Position (*E*)**

- |   |                               |
|---|-------------------------------|
| 1. Sum of Squared Errors<br>( $E^2 = X^2 + D_e^2 + Y^2$ )                 | <u>1002.7</u> NM <sup>2</sup> |
| 2. Total Probable Error of Position<br>( $E = \sqrt{X^2 + D_e^2 + Y^2}$ ) | <u>31.67</u> NM               |

**Total Available Search Effort Worksheet**

Case Title: **F/V SAMPLE** Case Number: **00-001** Date: **26 JAN 2000**

Planner's Name: **SAR SCHOOL** Datum Number: **1** Search Plan: A B C **A**

Datum **37-48.7 N** **065-26.3 W** Datum **37-39.6 N** **064-40.5 W**  
(left) Latitude Longitude (right) Latitude Longitude

Search Object: **Medium displacement fishing vessel** Date/Time **261630Z JAN 2000**

Total Available Effort Computations

	1	2	3	4	5
1. Search Sub-area Designation	<u><b>A-1</b></u>	<u><b>A-2</b></u>	_____	_____	_____
2. Search Facility Assigned	<u><b>C-130</b></u>	<u><b>P-3</b></u>	_____	_____	_____
3. Search Facility Speed (V)	<u><b>180</b></u>	<u><b>200</b></u>	_____	_____	_____
4. On Scene Endurance	<u><b>3.0</b></u>	<u><b>4.0</b></u>	_____	_____	_____
5. Daylight Hours Remaining	<u><b>7.5</b></u>	<u><b>7.5</b></u>	_____	_____	_____
6. Search Endurance (T) (T = 85% of lesser of <b>line 4</b> or <b>5</b> above.)	<u><b>2.55</b></u>	<u><b>3.40</b></u>	_____	_____	_____
7. Search Altitude	<u><b>500</b></u>	<u><b>1000</b></u>	_____	_____	_____
8. Uncorrected Sweep Width	<u><b>5.0</b></u>	<u><b>5.1</b></u>	_____	_____	_____
9. Weather, Terrain Correction Factor ( $f_w f_t$ )	<u><b>0.9</b></u>	<u><b>0.9</b></u>	_____	_____	_____
10. Velocity Correction Factor ( $f_v$ ) (aircraft only)	<u><b>1.0</b></u>	<u><b>1.0</b></u>	_____	_____	_____
11. Fatigue Correction Factor ( $f_f$ )	<u><b>1.0</b></u>	<u><b>1.0</b></u>	_____	_____	_____
12. Corrected Sweep Width (W)	<u><b>4.5</b></u>	<u><b>4.6</b></u>	_____	_____	_____
13. Available Search Effort ( $Z = V \times T \times W$ )	<u><b>2,065.5</b></u>	<u><b>3,128</b></u>	_____	_____	_____
14. Total Available Search Effort ( $Z_{ta} = Z_{a1} + Z_{a2} + Z_{a3} + \dots$ )				<u><b>5,193.5</b></u>	<b>NM<sup>2</sup></b>
15. Separation Ratio (SR) (leeway divergence datums only) (from <b>line H.3</b> of the <b>Datum Worksheet</b> .)				<u><b>1.18</b></u>	
16. If the separation ratio (SR) on <b>line 15</b> is greater than four ( $SR > 4$ ), go to the <b>Widely Diverging Datums Worksheet</b> . Otherwise, go to the <b>Effort Allocation Worksheet</b> .					

**Effort Allocation Worksheet  
For Optimal Search of Single Point, Leeway Divergence, or Line Datums**

Case Title: **F/V SAMPLE** Case Number: **00-001** Date: **26 JAN 2000**

Planner's Name: **SAR SCHOOL** Datum Number: **1** Search Plan: A B C **A**

Datum	<u><b>37-48.7 N</b></u>	<u><b>065-26.3 W</b></u>	Datum	<u><b>37-39.6 N</b></u>	<u><b>064-40.5 W</b></u>
(left)	Latitude	Longitude	(right)	Latitude	Longitude

Search Object: **Medium displacement fishing vessel** Date/Time **261630Z JAN 2000**

**Effort Allocation Computations**

1. Available Search Effort ( $Z_a$ ) **5,193.5** NM<sup>2</sup>  
(from **line 13** of **Total Available Search Effort Worksheet** or **line 5.a** or **line 5.b** of the **Widely Diverging Datums Worksheet**)
  
2. Effort Factor ( $f_z$ )
  - a. Total Probable Error of Position ( $E$ ) **31.66** NM
  - b. Length of Datum Line ( $L$ )            NM
  - c. Effort Factor ( $f_z$ ) ( $f_{zp} = E^2$  or  $f_{zl} = E \times L$ ) **1,002.7** NM<sup>2</sup>
  
3. Relative Effort ( $Z_r = Z_a/f_z$ ) **5.18**
  
4. Cumulative Relative Effort ( $Z_{rc} = \text{Previous } Z_{rc} + Z_r$ ) **5.18**
  
5. Optimal Search Factor ( $f_s$ )                      Ideal             Poor **X**      ( $f_s$ ) **1.1**
  
6. Optimal Search Radius ( $R_o = f_s \times E$ ) **34.83** NM
  
7. Optimal Search Area ( $A_o$ ) **7,464** NM<sup>2</sup>
  - a. Single Point Datum ( $A_o = 4 \times R_o^2$ )
  - b. Leeway Divergence Datums [ $A_o = (4 \times R_o^2) + (2 \times R_o \times DD)$ ]
  - c. Line Datum ( $A_o = 2 \times R_o \times L$ )
  
8. Optimal Coverage Factor ( $C_o = Z_a/A_o$ ) **0.70**

	1	2	3	4	5
9. Optimal Track Spacing ( $S_o = W/C_o$ )	<u>6.45</u>	<u>6.45</u>	_____	_____	_____
10. Nearest Assignable Track Spacing ( $S$ ) (within limits of search facility navigational capability)	<u>6.5</u>	<u>6.5</u>	_____	_____	_____
11. Adjusted Search Areas ( $A = V \times T \times S$ )	<u>2983.5</u>	<u>4420</u>	_____	_____	_____
12. Total Adjusted Search Area ( $A_t = A_1 + A_2 + A_3 + \dots$ )				<u>7,403.5</u>	NM <sup>2</sup>
13. Adjusted Search Radius ( $R$ )				<u>34.7</u>	NM

a. Single Point Datum 
$$R = \frac{\sqrt{A_t}}{2}$$

b. Leeway Divergence Datums 
$$R = \frac{\sqrt{DD^2 + (4 \times A_t)} - DD}{4}$$

c. Line Datum 
$$R = \frac{A_t}{2 \times L}$$

14. Adjusted Search Area Dimensions

a. Length Length 107 NM

i.) Single Point Datum  $Length = 2 \times R$

ii.) Leeway Divergence Datums  $Length = (2 \times R) + DD$

iii.) Line Datum Length of the Base Line ( $L_b$ ) \_\_\_\_\_ NM

a.) No Extensions  $Length = L_b$

b.) One Extension  $Length = R + L_b$

c.) Two Extensions  $Length = (2 \times R) + L_b$

b. Width =  $2 \times R$  Width 69 NM

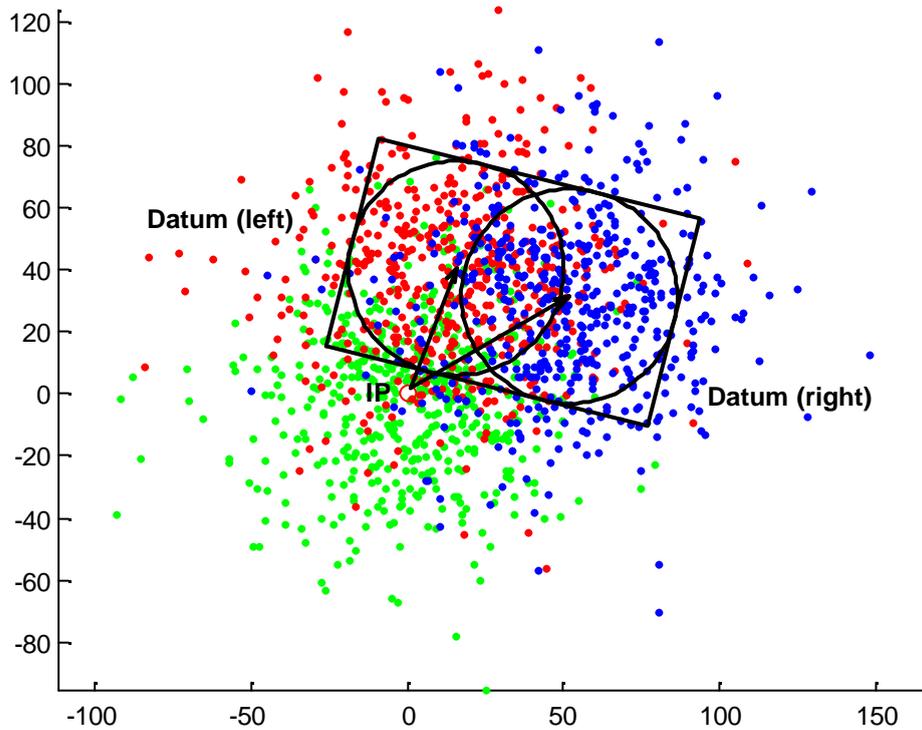
15. Plot the adjusted search area on a suitable chart (Check when done) \_\_\_\_\_

16. Divide the adjusted search area in to search sub-areas according to the values on **line 11**. (Check when done) \_\_\_\_\_

17. Go to the **Search Action Plan Worksheet**.

*See results of simulation on next page.*

**Results of a Monte Carlo Simulation  
 Using the F/V Sample Data for the Alpha Search**



Monte Carlo Simulation of F/V Sample – Alpha Search

Area	POC	Coverage	POD	POS
7,343 NM <sup>2</sup>	70.8%	0.70	50.2%	35.6%

Green/light grey dots represent some of the possible initial search object locations. Blue/black and red/dark grey dots (nearly indistinguishable if printed in black-and-white) represent some of the possible search object locations at the commence search time. There are 500 dots of each colour. Only the blue and red dots inside the search rectangle were counted and used to estimate the probability of the search object being in the search area at the commence search time.

### VOLUME III

**Insert** following paragraphs in page 2-21, before "**Helicopter Operations**":

*"Hi-Line Technique*

In certain circumstances, typically, poor weather, obstructed vision or confined winching area, it may not be possible to lower the helicopter crewman or lifting harness to the deck from directly above the vessel. In such cases the Hi-Line technique may be used.

- A weighted line, attached to the aircraft's hook by a weak link, is lowered to the vessel. It may be illuminated by cyaline lightsticks. The transfer area should give unobstructed access to the deck edge.
- The line should be handled by one member of the vessel's crew.
- **ONLY WHEN INSTRUCTED BY THE HELICOPTER CREW** the slack should be hauled in (it is advisable to wear gloves)
- **THE LINE MUST NOT BE MADE FAST.**
- The helicopter will pay out the line and descend to one side of the vessel while the crewman continues to take in the slack. A second crewmember should coil the spare line into a container, clear of obstructions.
- When the helicopter crewman or lifting harness reaches deck height the line must be hauled in to bring the winch hook on board (considerable effort may be required).
- The static discharge line must touch the vessel before contact with the hook is made.
- At any time the helicopter may discontinue the operation, in which case the line must be paid out immediately, clear of obstructions.
- When prepared for winching the helicopter crewman, if present, or a member of the vessel's crew, should indicate to the helicopter by hand signals.
- The helicopter will climb and winch in the cable. The line must be paid out maintaining sufficient force to prevent a swing.

If multiple transfers are required to be made the line should be retained. On the final lift the end of the line should be released over the side of the vessel."

Replace Tables in page 3-19 with the following tables;

**Sweep widths for helicopters (km (NM))**

<b>Search Object</b>	<b>Meteorological Visibility</b>		
	<b>1.9 (1)</b>	<b>9.3 (5)</b>	<b>&gt;37 (&gt;20)</b>
Person in water	0.0 (0.0)	0.2 (0.1)	0.2 (0.1)
4-person life raft	0.9 (0.5)	3.1 (1.7)	5.4 (2.9)
8-person life raft	0.9 (0.5)	3.9 (2.1)	7.0 (3.8)
15-person life raft	1.1 (0.6)	4.4 (2.4)	8.3 (4.5)
25-person life raft	1.1 (0.6)	5.2 (2.8)	10.6 (5.7)
Boat < 5m (17 ft)	0.9 (0.5)	3.0 (1.6)	4.6 (2.5)
Boat 6 m (20 ft)	1.3 (0.7)	5.6 (3.0)	10.9 (5.9)
Boat 10 m (33 ft)	1.3 (0.7)	7.2 (3.9)	16.9 (9.1)
Boat 24 m (82 ft)	1.5 (0.8)	10.6 (5.7)	34.3 (18.5)

**Sweep widths for fixed-wing aircraft (km (NM))**

<b>Search Object</b>	<b>Meteorological Visibility</b>		
	<b>1.9 (1)</b>	<b>9.3 (5)</b>	<b>&gt;37 (&gt;20)</b>
Person in water	0.0 (0.0)	0.2 (0.1)	0.2 (0.1)
4-person life raft	0.6 (0.3)	2.4 (1.3)	4.3 (2.3)
8-person life raft	0.7 (0.4)	3.1 (1.7)	5.6 (3.0)
15-person life raft	0.7 (0.4)	3.7 (2.0)	6.9 (3.7)
25-person life raft	0.7 (0.4)	4.3 (2.3)	8.7 (4.7)
Boat < 5m (17 ft)	0.7 (0.4)	2.4 (1.3)	3.7 (2.0)
Boat 6 m (20 ft)	0.9 (0.5)	4.6 (2.5)	9.3 (5.0)
Boat 10 m (33 ft)	0.9 (0.5)	6.3 (3.4)	14.4 (7.8)
Boat 24 m (82 ft)	1.1 (0.6)	9.4 (5.1)	30.9 (16.7)

\*\*\*



## ANNEX 9

**DRAFT MSC CIRCULAR ON GUIDELINES FOR PREPARING PLANS FOR  
CO-OPERATION BETWEEN SEARCH AND RESCUE SERVICES  
AND PASSENGER SHIPS (IN ACCORDANCE WITH SOLAS  
REGULATION V/7.3)**

1 The Maritime Safety Committee, at its [seventy-fourth session (30 May to 8 June 2001)], recalled that MSC 73, in adopting amendments to the 1974 SOLAS Convention, *inter alia*, revising chapter V, had also adopted regulation V/7.3, which requires all passenger ships to which SOLAS chapter I applies to have on board a plan for co-operation with appropriate search and rescue services in event of an emergency. Subsequently, MSC 73 had instructed the Sub-Committee on Radiocommunications and Search and Rescue (COMSAR) to revise MSC/Circ.864 on Guidelines for preparing plans for co-operation between search and rescue services and passenger ships on fixed routes (in accordance with SOLAS regulation V/15(c)), as appropriate.

2 The Committee, having considered the recommendations made by the COMSAR Sub-Committee, at its fifth session (11 to 15 December 2000), approved Guidelines for preparing plans for co-operation between SAR services and passenger ships (in accordance with SOLAS regulation V/7.3), as set out at the annex.

3 The Maritime Safety Committee, recalling the entry into force date of the 2000 SOLAS amendments, agreed that all ships to which SOLAS regulation V/7.3 applies should have co-operation plans in place by [1 July 2002].

4 Member Governments are invited to bring the annexed guidelines to the attention of SAR service providers, shipowners, ship operators, ship masters and others concerned and to use the provisions contained therein as appropriate.

5 MSC/Circ.864 is herewith revoked.

## ANNEX

### **GUIDELINES FOR PREPARING PLANS FOR CO-OPERATION BETWEEN SEARCH AND RESCUE SERVICES AND PASSENGER SHIPS (in accordance with SOLAS regulation V/7.3)<sup>1</sup>**

#### **1 Introduction**

- 1.1 The purpose of these Guidelines is to provide a uniform basis for the establishment of plans for co-operation between passenger ships and SAR services in accordance with SOLAS regulation V/7.3<sup>2</sup>. Co-operation plans developed in accordance with these Guidelines will meet the requirements of the revised regulation.
- 1.2 These Guidelines are applicable to all passenger ships to which SOLAS chapter I applies. They are relevant to the safety management system (SMS) maintained by passenger ships in accordance with the International Safety Management (ISM) Code and in particular to the section of the SMS dealing with emergency preparedness. They should also be taken into consideration when drawing up SAR co-operation plans for passenger ships in domestic trade.
- 1.3 These Guidelines serve the overall aim of efficiently establishing the tripartite emergency response network of the ship, the company (as defined in the ISM Code) and the SAR services.

#### **2 Aims & objectives of SAR Co-operation Planning**

- 2.1 The intent of SAR co-operation plans is to help to ensure that assistance can be provided to persons in distress at sea. SAR co-operation plans are to enhance mutual understanding between a ship, company and SAR services; this is best achieved by the prior exchange of information and by joint exercises.
- 2.2 The objectives of SAR co-operation planning are to:
  - enable the early and efficient establishment of contact in the event of emergency between the passenger ship, her operators' shorebased emergency response system and the SAR services. The SAR co-operation plan should ensure that all relevant contact details are known to each of the three parties beforehand and that these details are kept up-to-date;
  - provide the SAR services with easily accessible and up-to-date information about the ship - in particular her intended voyage, communications and emergency response systems; and
  - provide the ship and her operators with easily accessible information about SAR and other emergency services available in the ship's area of operation and to assist in decision-making and contingency planning.
- 2.3 The plan is not only of use when a passenger ship is herself the subject of an emergency.

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<sup>1</sup> Formerly regulation V/15(c). The revised regulation is in effect from 1 July 2002.

It will also be useful when passenger ships are acting as SAR facilities and, particularly, when taking on the role of On Scene Co-ordinator.

### **3 Regulatory requirements**

3.1 The text of regulation SOLAS V/7.3 is, as follows:

“Passenger ships, to which chapter I applies, shall have on board a plan for co-operation with appropriate search and rescue services in event of an emergency. The plan shall be developed in co-operation between the ship, the company, as defined in regulation IX/1, and the search and rescue services. The plan shall include provisions for periodic exercises to be undertaken to test its effectiveness. The plan shall be developed based on the guidelines developed by the Organization.”

### **4 General requirements**

4.1 Passenger ship operators’ emergency response plans should be linked to those of the SAR services responsible for the areas in which their ships operate, so that the tripartite response – i.e. the response on-board, the response from the company’s emergency response organization ashore and the response from the SAR services - is co-ordinated effectively and efficiently. It is the purpose of the SAR co-operation plan to act as that link.

4.2 The plan should contain the basic information which will enable the response to any emergency to commence without delay. This information will include direct contact details for the three parties - ship, company and SAR services - so that the tripartite response system may be established and linked from the outset.

4.3 Each of the parties to the plan should have access to a controlled copy of it, so that each party knows what information is available to the others.

### **5 Operational requirements**

5.1 The plan should be concise and user-friendly so as to enable its easy use in emergency conditions. It should, where appropriate, be drawn up according to the framework set out in the Appendices to these Guidelines. The use of a common framework enables SAR service personnel to find the information they require rapidly, whatever ship or company they are dealing with. Likewise, it enables crew members or members of the company emergency response team ashore, to find the information they require, whatever SAR region in which the emergency has occurred.

5.2 The framework is designed to enable modules of information (about different ships, or about each of the SAR regions along the ship’s route) to be easily added to the plan, or removed from it if no longer relevant, without a need for a whole plan to be revised.

5.3 The SAR co-operation plan does not replace more detailed emergency response plans already in place, whether as part of the company’s SMS or the SAR services’ arrangements.

## **6 Use by ships trading through many SAR regions**

- 6.1 It will significantly enhance the effectiveness and efficiency of any SAR response if passenger ship's crews and operators have a good understanding of the SAR services available to them in the areas where they operate and have established liaison links with those services. This is as true for passenger ships which routinely transit many SAR regions as for any other passenger ship.
- 6.2 However, there may be administrative difficulties in maintaining direct links between a ship transiting many SAR regions, such as a cruise ship, and each SAR service along her route. For such ships it is neither necessary and practical to hold a complete copy of a ship's SAR co-operation plan at every Rescue Co-ordination Centre (RCC), nor is it to maintain on board extensive details of every SAR service with which the ship may possibly come into contact.
- 6.3 This can be overcome by use of the SAR data provider<sup>2</sup> system which permits the use of contact points between the SAR services and the cruise ship operator.
- 6.4 In cases where the ship cannot establish direct communications with the RCC in whose area the ship is operating, then the SAR data provider must be able to provide essential information rapidly to the parties concerned on a 24-hour basis.
- 6.5 A passenger ship such as a ferry, which trades on fixed routes, should not use the SAR data provider system, but submit a plan to all SAR services along her route. Other passenger ships, such as cruise ships, are not required to draw up co-operation plans with more than one SAR service. When trading in one or more of the cruising areas, defined in paragraph 6.6 below, such ships are recommended to draw up a co-operation plan with one SAR service in each area. Ships using the SAR data provider system are not required to include in the plan information beyond that set out in Appendix 2 to these Guidelines. Regardless of which system ships use, they should be encouraged to make contact with the relevant SAR services.
- 6.6 For this purpose, 'cruising areas' are defined as:
- .1 'Eastern North Atlantic'
    - including the SAR regions of Europe (except that part of the France SAR Region co-ordinated from Martinique), Greenland, Iceland, Morocco and the Mediterranean and Black Seas;
  - .2 'Africa'
    - including the SAR Regions of Réunion, Mauritius, Seychelles and continental Africa except those of Morocco and the Mediterranean Sea;

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<sup>2</sup> The 'search and rescue data provider' is defined in the International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual as "a source for a rescue co-ordination center to contact to obtain data to support search and rescue operations..." (Vol I, page xi).

- .3 'North and Central America'
  - including the SAR regions of Canada, the United States, Central America, the Caribbean, and Colombia, Venezuela, Guyana, Suriname, French Guiana, and that part of the France SAR Region co-ordinated from Martinique;
- .4 'South America'
  - except the SAR regions of Colombia, Venezuela, Guyana, Suriname and French Guiana;
- .5 'Australasia'
  - including the SAR regions of Indonesia, Australia, New Zealand and the islands of the Southwest Pacific; and
- .6 'Asia'
  - including the SAR Regions of the Russian Federation, the Northwest Pacific, the Philippines, the Northern Indian Ocean and the China Sea, except that of Indonesia.

## **7 Administrative requirements**

- 7.1 In order to compile a SAR co-operation plan, the ship (or the company) should contact one of the SAR services responsible for the area in which the ship operates. If the SAR data provider system is being used, the SAR service contacted will be the appropriate global or regional contact. It is in any case recommended that neighbouring SAR services co-operate for administrative purposes, each holding copies of the others' modules of information, so that the ship or company need only contact one SAR service in order to complete the whole plan.
- 7.2 The ship or company and the SAR services compile the details required of them according to the framework (see Appendices). The ship or company is responsible for providing the information in chapter 1 'The company' and chapter 2 'The ship(s)'. The SAR services are responsible for providing the introductory paragraphs; chapter 3 'The RCCs' and chapter 4 'SAR facilities'. Chapter 5 'Media relations' and chapter 6 'Periodic exercises' should be considered jointly. Copies of the completed plan should be distributed to all relevant parties, using a controlled distribution system.
- 7.3 The plan should be written in:
  - the on-board working language(s) of the passenger ship; and
  - English and, if agreed, a language or languages commonly used by the ship, the company, and the SAR services.

The aim should be that all those likely to need to refer to the plan should have a copy readily available in a language in which they are fluent. The plan may be provided and distributed electronically if agreed between the ship, the company and the SAR services.

- 7.4 SAR co-operation plans, once they have been agreed, should be reciprocally recognised
- 7.5 The originator of each module of the plan (the ship, company, or SAR service, as appropriate) is responsible for keeping it up-to-date and ensuring that all those holding controlled copies of the module are advised of changes. Each holder of a controlled copy of the plan is responsible for recording notified changes.
- 7.6 Distribution of controlled copies of the plan should be consistent with the main aim of SAR co-operation planning; copies should therefore be available to each of the three parties to emergency response - the ship, the company, and the relevant SAR services. If the SAR data provider system is being utilised, the SAR data provider should hold copies of the plan for onward distribution to the co-ordinating RCC in the event of an emergency, or on request for contingency planning purposes. It is not essential that every RCC through whose SAR region the ship trades should hold a copy of the plan, only that each RCC should be able to obtain a copy from the relevant SAR data provider without delay.
- 7.7 Likewise, it is not essential for the ship to carry details of each and every SAR region's resources, if the SAR data provider system is being utilised. However, the ship should always be able to obtain such details via her nominated SAR data provider(s) without delay. It is recommended that SAR service modules be carried for at least those SAR regions in which the ship spends the majority of her time. As a minimum, the ship should carry contact details for her SAR data provider(s).
- 7.8 It is, of course, essential that all parties know *where* the SAR data are held. For SAR co-operation plans to be useful, their location has to be easily traced. Each plan should therefore contain a controlled distribution list. If using the SAR data provider system, RCCs *not* on the list may refer to a simple index<sup>3</sup>, to be available to all SAR services by [1 July 2002], which enables the user to look up a ship by any of three means of identification (name, call sign or MMSI) and to identify the RCC(s) which hold copies of that ship's SAR co-operation plan. Information in the index is deliberately limited; the plans themselves are the prime documents. Index entries should be submitted and kept up-to-date by SAR data provider.

## **8 Periodic exercises**

- 8.1 The regulation requires that the plan include provisions for periodic exercises to be undertaken to test its effectiveness.
- 8.2 Both frequency and type of exercise will depend on the circumstances in which the ship operates, availability of SAR service resources, etc. The ship should not be required to exercise her SAR co-operation arrangements more than once in any twelve month period. Whenever possible, such exercises should be held in conjunction with other exercises involving the ship.

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<sup>3</sup> The United Kingdom's contact information for the index to be inserted.

- 8.3 While it is very important that emergency response arrangements be tested jointly from time to time - by, for example, requesting local SAR service involvement in exercises already being run in accordance with the ISM Code and each ship's SMS requirements - it is also important that the benefits of such exercises are not diluted by *over*-exercising, or by always exercising in particular ways or with particular authorities. The aim should be to test all parts of the emergency response network realistically, over time. A wide variety of scenarios should be employed; different SAR services should be involved, if appropriate; and exercises should be so arranged as to allow all relevant staff (including relief staff) to participate over time.
- 8.4 Various types of exercise are acceptable: 'full-scale' or 'live', 'co-ordination', and/or 'communications' exercises may all be appropriate<sup>4</sup> 'Tabletop' exercises, SAR seminars and liaison exchanges involving ship's personnel, shorebased company emergency response personnel and SAR service personnel can be beneficial.
- 8.5 Exercises should be co-ordinated between the parties involved to ensure efficient use of available resources. The principle of reciprocity applies. If a ship has conducted a SAR co-operation exercise within the last twelve months, she should be deemed by all parties to have fulfilled the requirements of the regulation: the 'SAR service' should be considered a global entity in this context. Likewise, the SAR services of individual States should co-operate to ensure that passenger ships' exercise requirements are distributed between them in a way appropriate to available resources.
- 8.6 Exercises conducted under this regulation should occasionally include the passenger ship taking on the role of a SAR facility - and in particular the role of On Scene Co-ordinator, if appropriate.
- 8.7 Ships which have participated in actual SAR incidents may be deemed to have fulfilled the exercise requirements of this regulation.
- 8.8 Exercises conducted under this regulation should be formally recorded by all the main participants (ship, company and SAR service). The record should include at least the date, location and type of exercise and a list of the main participants. A copy of the record should be available aboard the ship for inspection.

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<sup>4</sup> IAMSAR Vol I, Chapter 3.3 refers.

APPENDIX 1

**PLAN FOR CO-OPERATION BETWEEN SEARCH AND RESCUE SERVICES AND  
PASSENGER SHIPS NOT USING THE SAR DATA PROVIDER SYSTEM**

**(IN ACCORDANCE WITH SOLAS REGULATION V/7.3)**

List of Contents

Introduction<sup>5</sup>

Description of a Plan for Co-operation<sup>6</sup>

1 The Company<sup>7</sup>

.1 name and address

.2 contact list

.2.1 24 hour emergency initial and alternative contact arrangements

.2.2 further communications arrangements (including direct telephone/fax links to relevant personnel)

.3 chartlet(s) showing details of route(s) and service(s) together with boundaries of relevant search and rescue regions (SRRs)<sup>8</sup>

.4 liaison arrangements between the Company and relevant RCCs<sup>9</sup>

4.1 provision of relevant incident information

- how specific information will be exchanged at the time of an incident, including details of persons, cargo and bunkers on board, SAR facilities and specialist support available at the time, etc

4.2 provision of liaison officer(s)

- arrangements for sending Company liaison officer(s) to the RCC, with access to supporting documentation concerning the Company and the ship(s); e.g. copies of fire control & safety plans as required by the flag state

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<sup>5</sup> To be prepared by the SAR Service.

<sup>6</sup> To be prepared by the SAR Service.

<sup>7</sup> As defined in the ISM Code.

<sup>8</sup> The chartlet may be replaced by a simple description, if appropriate.

<sup>9</sup> ie, how Company and SAR Service are to work together in the event of an emergency, including the provision of that information which will only be available at the time.

2 The ship(s)<sup>10</sup>

.1 [ship 1]<sup>11</sup>

.1.1 basic details of the ship

- MMSI
- call sign
- country of registry
- type of ship
- gross tonnage
- length overall (in metres)
- maximum permitted draught (in metres)
- service speed
- maximum number of persons allowed on board
- number of crew normally carried
- medical facilities

.1.2 communication equipment carried<sup>12</sup>

.1.3 simple plan of decks and profile of the ship, transmittable by electronic means, and including basic information on

- lifesaving equipment
- fire-fighting equipment
- plan of helicopter deck/winch area with approach sector
- helicopter types for which helicopter deck is designed
- means on board intended to be used to rescue people from the sea or from other vessels

and a colour picture of the ship

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<sup>10</sup> To be prepared by the Company

<sup>11</sup> Enter here the ship's name

<sup>12</sup> Enter here basic information on the ship's communications fit, frequencies available, identifiers, etc

- .2 [ship 2 - as for ship 1, etc]
- 3 The RCCs<sup>13</sup>
  - .1 search and rescue regions along the route
    - chartlet showing SRRs in relevant area of ships' operation
  - .2 SAR mission co-ordination (SMC)
    - definition
    - summary of functions
  - .3 on scene co-ordination (OSC)
    - definition
    - selection criteria
    - summary of functions
- 4 SAR facilities<sup>14</sup>
  - .1 [SRR]<sup>15</sup>
    - .1.1 RCC/RSCs along the route
      - addresses
    - .1.2 communications
      - equipment
      - frequencies available
      - watch maintained
      - contact list (MMSIs, call signs, telephone, fax and telex numbers)

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<sup>13</sup> To be prepared by the SAR service

<sup>14</sup> To be prepared by the SAR service.

<sup>15</sup> Enter here the name of the relevant state.

- .1.3 general description and availability of designated SAR units (surface and air) and additional facilities along the route, e.g.:
  - fast rescue vessels
  - other vessels
  - heavy/light helicopters
  - long range aircraft
  - fire fighting facilities
- .1.4 communications plan
- .1.5 search planning
- .1.6 medical advice/assistance
- .1.7 fire fighting, chemical hazards, etc
- .1.8 shore reception arrangements
- .1.9 informing next-of-kin
- .1.10 suspension/termination of SAR action
- .2 [SRR 2 - as for SRR 1, etc]
- 5 Media relations<sup>16</sup>
- 6 Periodic exercises<sup>17</sup>

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<sup>16</sup> To be prepared jointly by the Company and each SAR Service concerned.

<sup>17</sup> Frequency, form and content of training to be considered jointly by the Company and the SAR Service(s) concerned.

APPENDIX 2

**SIMPLIFIED PLAN FOR CO-OPERATION BETWEEN SEARCH AND RESCUE  
SERVICES AND PASSENGER SHIPS USING THE SAR DATA  
PROVIDER SYSTEM**

**(IN ACCORDANCE WITH SOLAS REGULATION V/7.3)**

- Introduction<sup>18</sup>
- 1 The Company<sup>19</sup>
- .1 name and address
- .2 contact list
- .2.1 24 hour emergency initial and alternative contact arrangements
- .2.2 further communications arrangements (including direct telephone/fax links to relevant personnel)
- .3 chartlet(s) showing details of route(s) and service(s) together with boundaries of relevant search and rescue regions (SRRs)<sup>20</sup>
- 2 The ship(s)<sup>21</sup>
- .1 [ship 1]<sup>22</sup>
- .1.1 basic details of the ship
- MMSI
  - call sign
  - country of registry
  - type of ship
  - gross tonnage
  - length overall (in metres)
  - maximum permitted draught (in metres)
  - service speed
  - maximum number of persons allowed on board
  - number of crew normally carried
  - medical facilities
- .1.2 communication equipment carried<sup>23</sup>

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<sup>18</sup> To be prepared by the SAR Service

<sup>19</sup> As defined in the ISM Code

<sup>20</sup> The chartlet may be replaced by a simple description, if appropriate.

<sup>21</sup> To be prepared by the Company

<sup>22</sup> Enter here the ship's name

<sup>23</sup> Enter here basic information on the ship's communications fit, frequencies available, identifiers, etc.

- .1.3 simple plan of decks and profile of the ship, transmittable by electronic means, and including basic information on
  - lifesaving equipment
  - fire-fighting equipment
  - arrangements for working with helicoptersand a picture of the ship
- .2 [ship 2 - as for ship 1, etc]
- 3 SAR Data Provider<sup>24</sup>
  - .1 [ ]<sup>25</sup>
    - .1.1 address
    - .1.2 communications
      - equipment
      - frequencies available
      - watch maintained
      - contact list (MMSI, call sign, telephone, fax and telex numbers)
- 4 Media relations<sup>26</sup>
- 5 Periodic exercises<sup>27</sup>

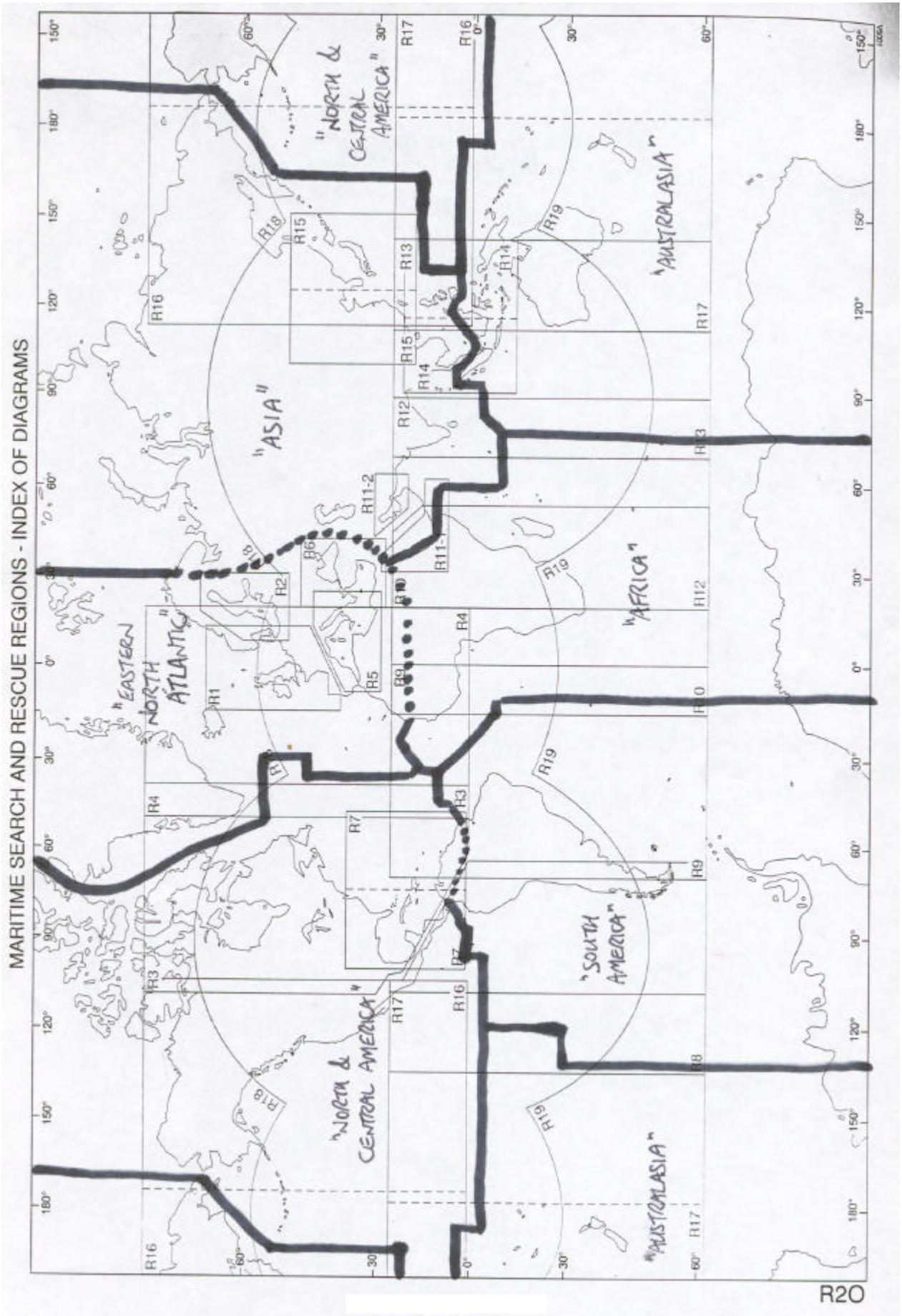
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<sup>24</sup> To be prepared by the SAR service.

<sup>25</sup> Enter here the name of the SAR Data Provider.

<sup>26</sup> Details of the Company's arrangements for working with the news media should be entered here.

<sup>27</sup> Exercises should be co-ordinated between the parties involved to ensure efficient use of available resources.



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**ANNEX 10**

**PROPOSED AMENDMENTS TO IMO STANDARD  
MARINE COMMUNICATION PHRASES  
(NAV 46/16/Add.1, annex 1 to annex 16)**

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**.11 Person overboard**

in sub-paragraph .1 insert after the word person "(s)";

**AI/1.2 Search and Rescue communication****.1 SAR communication** (specifying or supplementary to 1.1)

- in sub-paragraph .9.1 delete the following "/inadvertently switched on";
- insert new sub-paragraph .9.2 with the following words "Yes, I transmitted by mistake"; and
- replace sub-paragraph .10.2 with the following words "Yes, I transmitted by mistake".

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**Appendix to AI - External Communication Phrases****1 Standard Distress Message****.1 Structure**

replace in the second line words after "for" with the following "such as VHF Channel 16 or frequency 2182 kHz (if not automatically controlled) as follows:"

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**3 Standard Safety Message****.3 Example**

replace the word "OVER" at the end of the sentence with "OUT".

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**B2/6.3 Rescue operation – reporting readiness for assistance**

Delete in sub-paragraphs .1, .4 and 4.1 the words "/EPIRB transmission" after the word "signal" and before "/PAN".

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## ANNEX 11

**REVISED WORK PROGRAMME OF THE SUB-COMMITTEE  
AND DRAFT PROVISIONAL AGENDA FOR COMSAR 6**

**PROPOSED REVISED WORK PROGRAMME OF THE SUB-COMMITTEE**

		<b>Target completion date/number of sessions needed for completion</b>	<b>Reference</b>
1	<b>Global Maritime Distress and Safety System (GMDSS)</b>		COMSAR 5/14, section 3
	.1 <b>matters relating to the GMDSS Master Plan</b>	Continuous	COMSAR 5/14, paragraphs 3.1 to 3.10
	.2 replies to questionnaire on casualties	Continuous	COMSAR 1/30, paragraphs 3.15 to 3.16
	.3 exemptions from radio requirements	Continuous	COMSAR 4/14, paragraphs 3.38 to 3.41
2	Promulgation of maritime safety information (MSI) (in co-operation with ITU, IHO, WMO and <del>Inmarsat</del> <b>IMSO</b> )		
	.1 <b>operational and technical co-ordination provisions of Maritime Safety Information (MSI) services, including review of the related documents</b>	Continuous	COMSAR 5/14, paragraphs 3.11 to 3.28
3	<b>ITU World Radiocommunication Conference matters</b>	Continuous	COMSAR 5/14, section 5
4	<b>Radiocommunication ITU-R Study Group 8 matters</b>	Continuous	COMSAR 5/14, section 5

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- Notes:**
- 1 "H" means a high priority item and "L" means a low priority item. However, within the high and low priority groups, items have not been listed in any order of priority.
  - 2 Items printed in bold letters have been selected for the provisional agenda for COMSAR 6.
  - 3 Strikeout = proposed deletions  
Grey = proposed additions/changes

		<b>Target completion date/number of sessions needed for completion</b>	<b>Reference</b>
5	<b>Satellite services (Inmarsat and COSPAS-SARSAT)</b>	Continuous	COMSAR 5/14, section 6
6	<b>Matters concerning search and rescue, including those related to the 1979 SAR Conference and the introduction of the GMDSS</b>		
	<b>.1 harmonization of aeronautical and maritime search and rescue procedures, including SAR training matters</b>	<del>2000</del> 2002	COMSAR 4/14, paragraphs 8.1 to 8.19 COMSAR 5/14, paragraphs 8.1 to 8.20 and 11.5.2.1
	<b>.2 plan for the provision of maritime SAR services, including procedures for routing distress information in the GMDSS</b>	Continuous	COMSAR 5/14, paragraphs 8.25 to 8.92
	<b>.3 revision of the IAMSAR Manual</b>	Continuous	MSC 71/23, paragraph 20.22; COMSAR 5/14, paragraphs 8.21 to 8.24
7	<b>Emergency radiocommunications: false alerts and interference</b>	<del>2000</del> 2002	COMSAR 5/14, section 7 and paragraph 7.11
8	Casualty analysis (co-ordinated by FSI)	Continuous	MSC 70/23, paragraphs 9.17 and 20.4
H.1	<del>Work consequential to the 1988 GMDSS Conference</del>		<del>MSC 66/24, paragraphs 10.6 to 10.8 and 21.52; COMSAR 1/30, section 4 COMSAR 5/14, paragraph 11.5.1.1</del>

		<b>Target completion date/number of sessions needed for completion</b>	<b>Reference</b>
<del>1</del>	<del>review of the locating functions in the GMDSS</del>	<del>1 session</del>	<del>COMSAR 1/30, paragraph 4.26 COMSAR 5/14, paragraph 11.5.1.2</del>
H.2	<del>VTS and a</del> Automatic ship identification transponder/transceiver systems (co-ordinated by NAV)	1 session	MSC 66/24, paragraph 21.24.2; COMSAR 1/30, paragraphs 8.6 to 8.8 COMSAR 5/14, paragraph 11.5.1.3
H.3	<b>IMO Standard Marine Communication Phrases</b> (co-ordinated by NAV)	2000	COMSAR 1/30, section 23; MSC 71/23, paragraph 20.26 COMSAR 5/14, section 9 and paragraph 11.5.1.4
H.4	<b>Review of the Joint IMO/IHO/WMO MSI Manual</b>	2000	COMSAR 1/30, paragraph 5.9; COMSAR 3/14, paragraphs 11.4.4.1 COMSAR 5/14, paragraphs 3.29 to 3.35 and 11.5.1.5
H.5 1	<b>Procedures for responding to DSC alerts</b>	<del>2 sessions</del> 2003	COMSAR 4/14, paragraph 3.49; MSC 72/23, paragraph 21.32 COMSAR 5/14, paragraph 11.5.3.1
H.6 2	<b>Development of criteria for general radiocommunications</b>	2002	MSC 69/22, paragraph 20.36; COMSAR 4/14, paragraphs 3.55 to 3.60 COMSAR 5/14, section 4

		<b>Target completion date/number of sessions needed for completion</b>	<b>Reference</b>
H.7	3 Amendments to SOLAS chapter IV pursuant to the criteria set out in resolution A.888(21)	3 sessions	MSC 72/23, paragraph 21.33.1.2
H.8	4 <b>Development of a procedure for recognition of mobile-satellite systems</b>	<del>2 sessions</del> 2003	MSC 72/23, paragraph 21.33.1.3 COMSAR 5/14, paragraph 11.5.3.2
<b>H.5</b>	<b>Development of maritime radiocommunication systems and technology</b>	<b>2003</b>	<b>COMSAR 5/14, paragraphs 3.42 to 3.46</b>
<b>H.6</b>	<b>Bridge-to-bridge radicomunications</b>	<b>2003</b>	<b>COMSAR 5/14, paragraphs 3.42 to 3.46</b>
H.7	Port of refuge	1 session	COMSAR 5/14, paragraph 8.88
<del>L.1</del>	<del><b>Development of guidelines for ships operating in ice-covered waters</b></del> (co-ordinated by DE)	<del>2000</del>	<del>MSC 68/23, paragraph 20.4;</del> <del>MSC 71/23, paragraph 20.43;</del> <del>COMSAR 4/14, section 10</del> <del>COMSAR 5/14, section 10 and paragraph 11.5.1.6</del>
L.2	1 <b>Harmonization of GMDSS requirements for radio installations on board SOLAS ships</b>	2002	MSC 71/23, paragraph 20.23 COMSAR 5/14, paragraphs 3.36 to 3.41

## DRAFT PROVISIONAL AGENDA FOR COMSAR 6\*

- Opening of the session
- 1 Adoption of the agenda
  - 2 Decisions of other IMO bodies
  - 3 Global Maritime Distress and Safety System (GMDSS)
    - .1 matters relating to the GMDSS Master Plan
    - .2 operational and technical co-ordination provisions of Maritime Safety Information (MSI) services [, including review of the related documents]\*\*
    - .3 procedure for responding to DSC alerts
    - .4 harmonization for GMDSS requirements for radio installations on board SOLAS ships
  - 4 Development of criteria for general radiocommunications
  - 5 ITU maritime radiocommunication matters
    - .1 Radiocommunication ITU-R Study Group 8
    - .2 ITU World Radiocommunication Conference
  - 6 Satellite services (Inmarsat and COSPAS-SARSAT)
  - [ 7 Emergency radiocommunications: false alerts and interference]\*\*
  - 8 Matters concerning search and rescue, including those related to the 1979 SAR Conference and the introduction of the GMDSS
    - [.1 harmonization of aeronautical and maritime search and rescue procedures, including SAR training matters]\*\*
    - .2 plan for the provision of maritime SAR services, including procedures for routing distress information in the GMDSS
    - .3 revision of the IAMSAR Manual
    - [.4 development of a list of contents for a medical first aid kit for certain ro-ro passenger ships for utilization by a medical doctor]\*\*

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\* Agenda item numbers do not necessarily indicate priority.  
\*\* Subject for approval by MSC 74.

- [ 9 Development of maritime radiocommunication systems and technology]\*\*
  - [10 Bridge-to-bridge radiocommunications]\*\*
  - 11 Development of a procedure for recognition of mobile-satellite systems
  - 12 Work programme and agenda for COMSAR 7
  - 13 Election of Chairman and Vice-Chairman for 2002
  - 14 Any other business
  - 15 Report to the Maritime Safety Committee
-